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[ORIGINAL COMMUNICATION.]

THE ART OF DISPENSING.

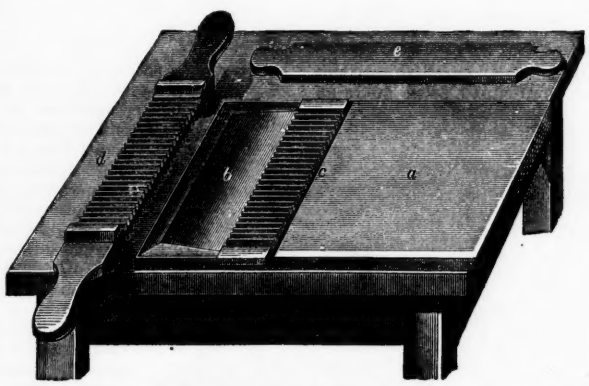
[Continued from page 49.]

PILLS AND THEIR PREPARATION.

THE characteristics of well-made pills are: that they are not too soft; do not stick together nor flatten; that they are smooth and round; all of the same size, and that they all contain similar proportions of the ingredients.

As far as possible it is advisable that pills should be of the same weight as prescribed, although this is not always possible owing to the soft condition of some extracts requiring an addition of a powder to make them firm enough to be rolled. A soft extract may be evaporated to increase its consistence, but it is inconvenient to do this at the dispensing counter while the prescription is being compounded; therefore it is well to be prepared beforehand, and to have the more commonly used extracts both in a soft condition and in a state sufficiently hard to be rolled into pills with but little or no addition of powder. Some extracts are best kept in powdered state (the compound extract of colocynth being a notable instance), but it is not possible to do this with all, for many, after being powdered, will gather moisture from the air and run together into a mass.

Where pills of one kind are frequently prescribed, it will be found convenient to keep the mass in form of powder and ready to be mixed when wanted, *e. g.*, compound cathartic pill, pill of aloes and myrrh, compound rhubarb pills, etc. When a pill mass cannot be kept in a powdered condition, but must be in the form of a mass, it is well to wrap it in paraffin paper and place it in a covered jar until wanted.



Pill-machine.—*a*, the bed on which the mass is rolled with the aid of the rolling-board *e*; *b*, receptacle for the pills after they have been divided by the metallic cutters *c* and *d*.

A mass to be in good condition to form a pill must be sufficiently firm, plastic and adhesive, and the ingredients of which it is composed should be intimately mixed, no individual particles being discernible. The parts should be held together by some substance with sufficient cohesion to endure the process of rolling and cutting without crumbling or cracking. The pills, when formed, should remain perfectly globular, and should still be soluble in the fluids of the stomach and intestines soon after being taken. Failure to obtain these conditions may be ascribed to a variety of causes, as, for example, excess or deficiency of a moist extract, presence of hygroscopic or deliquescent bodies, chemical incompatibility of ingredients, excess of essential or fixed oils, injudicious choice and use of excipients, or bad manipulation.

The plasticity of a mass is obtained by thorough working or kneading. To do this, the pestle and mortar must be freely used, or the kneading may, in some instances, be done with the hands. Adhesiveness may be obtained from the extracts, if any are ordered, or by means of excipients. It may suffice to heat a mass to render it soft and capable of being rolled, in which case it will become firm again as it cools. Much care, however, must be exercised in using heat, since it is liable to impair or utterly destroy the medicinal value of some drugs. It will usually be found that by placing the mortar and pestle in hot water for a few minutes, they will become warm enough to facilitate the process of kneading.

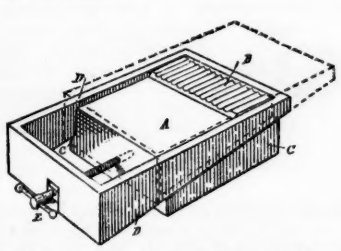
A small water-bath (always a valuable article of furniture on a dispensing counter) or a small hot-water plate should be at hand for evaporating extracts or softening a mass. The manipulation of large quantities of pill-mass, and many of the operations connected with pill-making, are greatly facilitated by the use of a smooth slab of iron about nine inches square (one-quarter-inch boiler plate will answer); this is quickly warmed over a gas stove, and when contact with the finger indicates a proper temperature, it can be removed and the mass placed upon it. Pills containing much gum resin should be made with its assistance. Black pitch, solid Chian turpentine, and other substances hard and brittle in the cold may be rolled upon the warm iron slab and made into pills without addition of a liquid excipient, but some require fibrous material, such as licorice powder or lycopodium, in order to prevent their falling. Substances that are efflorescent should be deprived of their water of crystallization before being made into pills; those that are decomposed by iron, such as corrosive sublimate, calomel, nitrate of silver, copper and bismuth salts, must not be mixed in an iron mortar. Crystallized salts, fluid acids, or soft extracts with an organic powder often make a mass of muddy consistence, which rights itself by waiting ten to fifteen minutes. Time should always be given an organic powder to absorb moisture.

When a prescription calls for several powders, always see that they are well mixed together before adding any extract or excipient. If, in addition to two or more powders, there is more than one extract, the powders and the extracts should be mixed separately, then added to each other. By this means you can be sure your pill-mass is well mixed.

EXCIPIENTS.

The excipient is the substance, either liquid or solid, which is added to the ingredients of a prescription to bind them together, and thus give them such a consistence that they may be massed and rolled into shape. To be able to select the best excipient for the prescription on which he is at work, the dispenser acquires a knowledge of the physical properties of the drugs which it contains. Where no excipient is ordered, the simplest should be selected, and that which gives the least increase to the size of the pill. Generally speaking, the dispenser has one excipient that he prefers and uses in the majority of cases; it may not be the best in every case, but, because he is in the habit of using it, and knows well its massing powers, he can produce better results with it than with any other, and if he should try to make a mass with any other excipient, the chances are that the attempt would end, at least in the first instance, in failure. A dispenser should, however, familiarize himself with the use of many different kinds of excipients, so as not to get into the rut of using only one or two; for a prescription should be prepared the same way each time, though different pharmacists work it at different times. It is necessary for the dispenser to be ready for any emergency on a prescription, and unless he has gained this element of familiarity with all things connected with his work, he is liable at any time to be put to a disadvantage.

Many things have been recommended as excipients: Water, alcohol, mucilage, or powdered acacia, glycerin, honey, glucose, simple syrup, confection of roses, powdered althæa, bread crumbs, glycerite of starch, glycerite of tragacanth, and in some cases resin cerate, wax, Cacao butter, and petrolatum. Of these, the best for general use is the glycerite of starch.



A contrivance enabling the operator to regulate the thickness of the "pipe."

Water, Alcohol.—Many substances do not require the addition of any other excipient than water, or, in cases where resinous substances are prescribed, alcohol alone may be the only thing needed, as often water or alcohol will develop enough adhesiveness to form the mass; the great objection to the use of either of those liquids without the aid of other excipients is, the pills made with them become very hard; they possess one advantage, which is not always remembered, of sometimes diminishing the bulk of the pill by partially dissolving the ingredients; often pills, that otherwise would be of inconvenient size, can be made more satisfactory, in this respect, to the patient. Water, alcohol, or any other excipient should not be used alone when they are capable of perfectly dissolving the solid substance of the pill; for though the pills may be firm enough when dispensed, after standing, especially

in warm weather, they are apt to run together in the box. In such instances an adhesive powder should be used to overcome the difficulty.

Mucilage, Powdered Gum Arabic, or Tragacanth are very adhesive excipients, and may be used; but they are often objectionable by causing the mass to become too hard and insoluble. With some substances (such as calomel), acacia forms a perfect cement. Tragacanth, when added in too great quantity, causes the mass to become so elastic that it is almost impossible to roll it out.

Syrup, Honey, Glucose, are all adhesive and valuable excipients, but should be used in connection with glycerin to prevent the excessive hardening of the pill. In the selection of these, syrup or glucose should be used for light-colored masses, as honey is apt to make the mass dark.

Glycerin is valuable, as it prevents the pills from becoming hard; it is somewhat adhesive, and for quinine pills that are not to be coated is one of the best excipients that can be used. It is best to mix it with one-third of its weight of water or alcohol.

Fig. 1.

Fig. 2.
Varieties of dropping bottles.

Confection of Roses, an old-time excipient, is not used much now, as it adds too much to the bulk of the pill, and is no better than many other excipients; it is useful sometimes when small quantities of active ingredients are to be made into pills, such as strychnine or podophyllum. It should never be used with iron compounds, as it is incompatible with them.

Soap is an excellent excipient for some masses, especially if they contain resinous substances, as it increases their solubility. This excipient is ordered in the U. S. Pharmacopœia for Pilulæ aloes, Pil. asafœtidæ, Pil. opium, and Pil. rhei. It should be in a very fine powder; it is not suitable for masses containing acid salts, acids, metallic salts, or tannin, as these decompose it. In using this excipient, care must be taken not to use too much water. The mass will at first appear dry and crumbly, and the dispenser is tempted to add more water, but soon finds that he has too soft a mass. Alcohol has this effect on soap masses to a still greater extent, so that it has to be used more carefully.

Vial's pill-rounder.

Bread Crumb, mica panis, is an excipient that has been recommended for many years for volatile oils, creasote, etc., but it is rare to find any one who uses it at the present day. It has been tried in every form recommended, and many experiments repeated, and in every case an equal if not a better excipient could have been employed. Either the mass crumbles, or is in an unmanageable paste, or oozes with uncombined oily matter. Pills *can* be made with bread crumb, but they require such attention, and so frequently disappoint the dispenser, that this excipient is not worthy to retain a place in practical pharmacy. When mica panis is ordered as an excipient, which is not a common thing, wheat flour and water q. s. may be used, if these will make a mass with the medicinal ingredients.

Althæa gives adhesiveness and is useful as an absorbent, but is open to the objections of increasing the bulk of the pills too much, is apt to make the mass too elastic to work well into shape, and causes hardness.

Wax has been recommended as an excipient for balsams, oils, etc.; but it is objectionable, owing to its insolubility in water, and consequently in the fluids of the stomach. An ordinary pill, though much harder than a wax pill, may dissolve in the stomach, because its ingredients are soluble in water. This excipient should not be employed if it be necessary to use such a quantity of it that the melting point of the mass is raised above the heat of the body, for the pill will pass the body unchanged. The wax must be melted very slowly, and with a very gentle heat, with some of the substance with which it is mixed. When the mixture is quite cold, the other ingredients are to be combined. The addition of ether or spirit destroys the plasticity of this compound.

Cacao Butter and Petrolatum (vaseline) are both used for oxidizable substances, such as permanganate of potassium.

Glycerite of Starch (U. S. P.) is probably the best general excipient for pills that can be employed. It is white, and of an unctious consistence, and, therefore, convenient to use. It will form almost any substance, no matter how dry or contrary, into a firm, tenacious mass; the glycerin in it prevents the pill from becoming hard, and it does not have the tendency to draw moisture so readily as when glycerin alone is used in the mass; it adds but little to the bulk of the pill, its excellence is appreciated at once, and experience with its power of massing pills will prevent any one from resorting to other excipients.

Glycerite of Tragacanth, next to glycerite of starch, is a favorite with some dispensers, but for certain substances it is too thick and tough; it is used principally for pills containing salts and metallic oxides, such as bromide of potassium and subnitrate of bismuth. In using both this and the glycerite of starch, the mass must be well kneaded, or more of the excipient will be used than is really necessary.

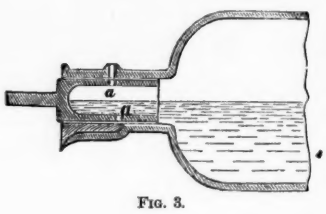
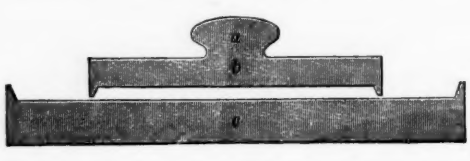


Fig. 3.

The quantity of an excipient necessary to mass the pill should be known beforehand. This knowledge, of course, can only be gained by experience; but when known, it will save considerable trouble, for the addition of the excipient adds much to the labor, and not infrequently to the size of the pill. If it seems necessary to make pills up to a certain weight—more than the ingredients of the prescription call for—add the right proportion of some inert powder, and always make a note of its quantity, also the quantity of the excipient used, upon the prescription, so that when it is renewed the pills will always be of the same size. Great care should be taken that pills dispensed at one time should not differ in size from the same dispensed at another. Generally it will be found that pills are seldom prescribed more than two grains each in weight. It is a good plan before rolling into pills to weigh the mass to see that it corresponds with the total weight of the ingredients. Be careful to scrape all the mass out of the mortar, for frequently it will be found that a large proportion is left there unless this is done.

Pill-sieve.



Pill-rounder.

Pill-sieve.

When using a liquid or any excipient, be careful not to use too much, or the mass will be made too soft and will require an addition of some powder to render it firm, and thus too much bulk will be given your pills. When fluids require to be added to form a pill-mass, it will be found risky to add them directly to the mass from their containers, for generally too much will be dropped on; a good plan is to drop the fluid first upon the point of a spatula, and from it to the mortar in quantity necessary to form a mass. Salts easily soluble in water naturally require very careful addition of moisture. To drop an excipient, it is well to use a pipette (a small glass tube with one end drawn out fine and a rubber nipple on the other); they are made so as to drop 60 drops to the fluidrachm, and can be purchased for about 25 or 30 cents per dozen; or a dropping-bottle called Salleron's drop counter (see Fig. 2) can be used, or an ordinary bottle with a wide mouth can be taken and fitted with a rubber stopper having two holes with a glass tube in each, one of the tubes having an imperforated nipple on it, the other tube being drawn

out to a small point. By compressing the nipple, air is blown into the bottle and forces the liquid out of the other tube. This is an invention of Mr. Raoul Bravais. Wharton's dropper serves a good purpose for regulating the flow of liquid excipients for pills. Any pharmacist can make one by simply taking an empty morphine bottle and boring a hole into the shoulder by means of a rat-tail file kept moist by turpentine; insert a bent tube, glass or otherwise, make it air-tight, close the mouth of the bottle with a small finger stall drawn tightly over it. By slight pressure any liquid contained in the bottle flows through the tube drop by drop, or it may be caused to flow in a stream if desired. An ordinary empty 1-oz. wide-mouth bottle may be fitted with a sheet of india-rubber a little larger than the mouth of the bottle, and a hole in the centre; a glass rod running to the end of which is enlarged and drawn out fine; by dipping the rod in the liquid, enough will collect on and may be dropped off.

Have several bottles on the prescription counter containing the various liquid excipients, fitted up in any of these ways so as to be handy when wanted, especially one with glycerin and water and one with glycerin and alcohol. Never use the same spatula to scrape the mass from the mortar or pestle and to dip in the excipient or extract jar. Have plenty of spatulas, so as to use a clean one for each ingredient that cannot be easily wiped off. When the quantity of extract ordered would make the mass too soft, the dispenser must either use it in a drier state or add some inert powder to it. Hager suggests that some powder of the same plant may be substituted for a portion of the extract, as for instance, if 20 grains of extract gentian are ordered, 10 grains of the extract might be used with 10 grains of powdered gentian; but this is objectionable from the variation which is apt to occur in the size of the pill, 10 grains of extract and 10 grains of the crude powder frequently producing an objectionable increase in the bulk of the pill. The better plan in such cases is to diminish rather than increase the size, and the extract had better be evaporated to a proper consistence, and for this reason every pharmacist should have some simple and ready appliance for accomplishing this without risk to the extract.

Rolling.—In most establishments there is available but one size of pill machine. On that must be rolled all masses whether it is to be divided into 1 grain or 5 grain pills, and it is often a matter of difficulty to roll out a small pill upon the large machine. To meet this disadvantage, a pill roller may be used, made of hard wood, such as maple, pear, or box. It should be about three inches broad, or any length less than the breadth of the machine, the handle securely fixed into the bottom piece with glue; or the roller may be fitted, like a horse-brush, with a leather strap nailed to each side, going across the top, under which the four fingers of the hand are placed, while the thumb fits on one side to steady it. If made of wood ⅛ inch thick, 6 inches long, and 4 inches broad, it will be found very convenient to use not alone for rolling into pipe, but also to help work the mass up. Another idea is to insert into the bed of the machine a piece of mahogany or walnut board (about ⅛ inch thick), made the required size, so that it may slip into the machine and be a tight fit. By this arrangement the ordinary roller can be used, and ½ grain or 1 grain pills are rolled out quite easily. Failing these, the pill roller itself can be used by turning it lengthwise to the machine. Care must be exercised to see that the pipe is equally rolled out, and not let any portion of the mass be larger or smaller than the other, or your pills will not be uniform in size. It will be found necessary to take the pipe between the fingers, and straighten out any inequalities.

Rounding.—Pills are generally rounded with a pill-rounder. Rounding pills with the fingers is only permissible when the mass is of such a character that it crumbles under the rounder. The ordinary rounder has a deep and a shallow side, so that large and small sizes may be rounded in it; but if either is too deep, the insertion of a piece of cardboard is useful. A French pill rounder is made (Vial's *Disque a pilules*) which can be put together to suit any ordinary size; or if there be no regular pill rounder handy, the cover of a small, round wooden box can be extemporized. The cut pills are laid on a tray, or on the pill machine, sprinkled with powder, and, being covered by the rounder, they are rapidly, and with slight pressure, revolved.

Powder is used to prevent pills from sticking to each other or the box, and to some extent to conceal their taste. When no particular powder is ordered, lycopodium is what is commonly used. Starch powder, cinnamon, magnesia, licorice, and powdered French chalk are all used. Licorice or cinnamon is apt to give a taste to the pill which is often objectionable to the patient; powdered French chalk is apt to make the slab slippery. This may be overcome by the addition of a little starch powder. Do not make the mistake of leaving too much powder in the box when you pass the prescription out; either blow out or use a pill sieve to remove the surplus powder. Pills with hygroscopic, strong-smelling, or volatile ingredients should always be dispensed in bottles.

[To be continued.]

[Original Communication.]

A PRACTICAL MODE OF GRADUATING RECEIVERS.

In percolation and other processes where a certain volume of a liquid is to be obtained, and where a graduated bottle is not at hand, it is usually the custom to paste a strip of paper on the bottle at the point to which the liquid is to come.

In order that the operator may not forget whether the liquid is to come on a line with the upper or lower edge of the paper strip, it has been my custom to use a triangular piece of paper, so there is but one edge parallel with the surface of the liquid.

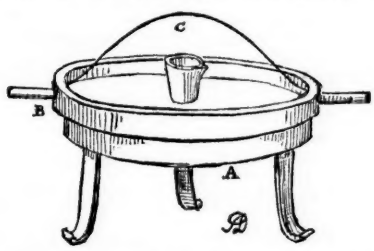
E. H. W. Stahlhuth.

Columbus, Ind., March 1st, 1889.

SUBLIMING APPARATUS.

J. W. Bruehl has had occasion to carry out a large number of sublimations, chiefly for the purpose of purifying certain substances, and has found the apparatus here described to be specially serviceable.

It consists of a nickel-plated circular brass box B, resting upon an ordinary tripod A. The brass box has two lateral tubes, for the passage of a current of cold water. In the centre, the box has an orifice large enough to permit the insertion of a crucible, which hangs down sufficiently low to permit its bottom being heated by a very small flame, without also heating the brass box. The latter acts, of course, as a condenser. The whole is covered with a glass bell. The crucible should touch the box only at a line in its circumference, and not at any extended portion of its surface, and it is preferably chosen of some well conducting metal, such as copper, platinum, etc. The glass bell should not be high, but rather flat, as in this case the sublimed crystals will scarcely at all collect on the glass, but on the cold surface of the box, from which they may easily be removed.—*Berichte*, 1889, 238.



Solution of Albuminate of Iron.

Eugene Dieterich, of Helfenberg, has published a new process for making this preparation. He points out that the various commercial articles known as "Soluble Albuminate of Iron" differ very much among themselves, some of them being practically insoluble, so as to be useless for preparing the "Liquor Ferri Albuminati." Dieterich himself had previously offered or used formulas which, though the best he could give, were not always satisfactory. He has, however, since then succeeded in making an albuminate of iron (ferric) which, when in fine powder, is easily soluble to a clear liquid in *very* dilute solution of soda. In its dry condition it appears as an ochre-yellow powder, without odor or taste, and neutral to test-paper. On triturating 1 Gm. with 40 Gm. of water in a mortar, and subsequently adding 0.4 Gm. of solution of soda [15%], the compound will dissolve to a garnet-red liquid. It contains about 20 per cent of iron (Fe). For the present no process is published by Dieterich, this being probably reserved for a subsequent publication.

The solution of albuminate of iron is to be prepared as follows:

	Parts.
Soluble Albuminate of Iron (Dieterich's dry)	20
Solution of Soda (sp. gr. 1.160)	8
Alcohol	100
Brandy	100
Tincture of Ginger	1.5
" " Galanga	1.5
" " Cinnamon	1.5
Water	enough to make 780

Triturate the albuminate in a mortar, with water, transfer to a flask and add the remainder of the water. Now add the solution of soda, shake repeatedly until solution is effected, and then add the alcohol, brandy, and tinctures.

In place of the tinctures the Pharmacopœia Committee of the German Pharmaceutical Association recommends to use 250 parts of cinnamon water, which are to replace an equal volume of common water.

The product is a clear, garnet-red liquid containing 0.4 per cent of iron (Fe).—After *Pharm. Centralh.*, No. 12.

Oils of Cassia and Anise.

SOME important particulars with regard to what (according to the writers) appears to be becoming the general practice of adulterating essential oil of cassia are given in Messrs. Schimmel & Co.'s April report. After referring to the manner in which the price of that oil on the Hong Kong market has advanced from $103 per picul, or about 3s. 2½d. per lb., in September, 1888, to $120 per picul, or, say, 3s. 9d. per lb., in February, 1889, and still appears to show signs of a further rise, the report makes mention of a rather alarming discovery which has been made at Messrs. Schimmel's works during the rectifying of some cassia oil. The rectification, in short, would seem to have revealed the fact that the greater part of the cassia oil of commerce is of a greatly adulterated nature, and nothing short of united and energetic action of the European buyers at the Chinese ports will suffice, it is said, to put a stop to this evil practice.

Cassia oil is brought into commerce by the European agents in Macao, Canton, and Hong Kong, who buy it from the native producers through the medium of Chinese middlemen. The labels affixed to the packages all bear the name of Macao, but Messrs. Schimmel & Co. state—what, indeed, is well known—that the oil is not actually distilled there. They suspect that the sophisticators of the drug are the distillers themselves, who bring it to the trade centres already adulterated. A shipment which was accompanied by a guarantee from the Hong Kong Medical Hall declaring it to be genuine unadulterated oil of cassia, of 1.060 specific gravity, dissolving readily in alcohol at 80° F., and perfectly volatile, when tested by purchasers in Europe was found to contain no less than 20 per cent of an insoluble resin, as well as a not inconsiderable percentage of petroleum, the latter having probably been added in order to again bring up the specific gravity and the consistency of the mixture to the nominal point of pure cassia oil. The examination of samples taken from four of the principal brands of cassia oil now in commerce, viz.:

Yellow label with American eagle and name Yan Loong, Macao;

Yellow label with sailing vessel and name Cheong Loong, Macao;

Pink label with flower design and name Luen Tai, Macao;

Red label with words "Best Cassia Oil" and name Ying Chong, Macao,

showed that the first three named were grossly adulterated. The appearance, so it is stated, of these oils at once excites suspicion by the dark brown color and the unusual consistence of the samples—the oil when shaken being apt to cling to the sides of the bottle. The specific gravity of the samples under examination did not differ much from that mentioned in the certificate of purity, ranging from 1.052 to 1.065. The boiling points lay between 200° and 295°. After distillation between 23 and 26 per cent of the sample remained behind in the shape of a brittle resin. In order to remove all doubt as to the character of the samples, and with a view of forestalling the anticipated explanation that resin was caused by heating over an open fire, several canisters of the three brands indicated were distilled over water. The bulk of the distillate so obtained sank to the bottom of the water, and the latter was found upon examination to be petroleum. The distillation over water also yielded between 19 and 26 per cent of a residual resin, of a brittle character. The fourth parcel of cassia oil—that of the Ying Chong chop—only gave a loss of 7 per cent in the distillation over water, while the whole of the residue remained liquid. This chop, therefore, the investigators recommend to the attention of the Hong Kong and Macao agents.

For the proper examination of the oil it is absolutely necessary to distil it over an open fire or by means of vapor. The residue should not harden when cooling, and the parts which volatilize first should have no flavor of petroleum. If the distillation is continued, about 90 per cent of pure cassia oil should be distilled by the water vapor, and the rectified oil should have a specific gravity of between 1.055 and 1.065. With regard to Messrs. Schimmel & Co.'s somewhat alarming assertions, we may say that in England buyers attach very little weight to the labels on the packages, as it is the universal custom among the large consumers to buy the oil according to sample, and it does not seem that this mode of doing business has thus far given rise to any unusual number of claims. Some of the continental customers of our exporters do indeed give the preference to one particular brand or the other; but as a great deal of the continental business in cassia oil is now transacted directly, the fancies of continental consumers do not any longer affect the trade in this country. It appears that the cassia oil, though shipped to Europe from Hong Kong, is all brought there from Macao, further southward. Macao is in fact the market where the oil originally changes possession from the hands of the natives into those of European dealers; but as it is a decaying old town, and not, we believe, in direct communication with Europe, the oil has to be sent on to Hong Kong for further shipment. With the further opening up of the borderland between China and Tonkin, it is probable that cassia oil, as well as most other products of Southern China which now find their way *via* Macao, will be diverted to other routes.

A second statement in Messrs. Schimmel's report to which we desire to draw special attention is that referring to the relative output of oil of star anise and of European anise. In the report, Mr. John C. Umney and Mr. John Moss are found fault with because the former, in a paper on the congealing point of oil of anise, read at an evening meeting of the Pharmaceutical Society last February, stated that by far the greater portion of the anise oil now used in commerce was that of star anise. "A very high authority," the author of the paper continued, "gives it that for every lb. of 'aniseed' oil (*Pimpinella Anisum*) one would meet with 1,000 lbs. or even more of star-anise oil (*Illicium anisatum*)." And in the debate following the paper, Mr. Moss asserted that he believed the proportion of one to a thousand to be much below the mark, and the real figures to be nearer one in ten thousand. "It is evident from these statements," now say Messrs. Schimmel, "that our English colleagues very much underestimate the importance of the manufacture of anise oil; and as we cannot allow their erroneous statements to obtain further currency, we wish to point out as follows: In our factory alone, under normal conditions, 7,000 kilos. (=140 cwt.) of aniseed are worked every day, equalling a daily production of 200 kilos. of oil. Between October, 1887, and May, 1888, about 800,000 kilos. (=800 tons) of aniseed were consumed on our works, producing about 24,000 kilos., or 53,500 lbs., of oil, and we are well within the mark if we calculate the production of aniseed oil from *Pimpinella Anisum* as follows:

	Kilos.		about lbs.
Germany	30,000	=	" 67,000
Russia	10,000	=	" 22,500
Austria	2,000	=	" 4,500
	42,000	=	" 94,000

which by weight equals 1,400 cases of star-anise oil. It may be questioned whether the entire yearly production of star-anise oil equals 1,400 cases, let alone 1,000 or 10,000 times that number." And in another paragraph they add: "As regards oil of star anise, that article has been very much pushed in the background in several of the principal consuming centres, in consequence of the low prices of oil of anise. Even in markets such as North America, where, some years ago, star-anise oil was used almost exclusively, the employment of oil of anise advances every year." Now, we believe Messrs. Schimmel & Co. are rather under a misapprehension if they believe that the speakers at the evening meeting referred, or meant to refer, to the world's consumption of oil of anise. They did nothing of the kind. Both Mr. Umney and Mr. Moss (though the latter might, perhaps, have been content without improving upon the previous speaker's statement) referred throughout their remarks to the consumption of anise oil in England only, and both were perfectly well aware that in Germany, and other countries where the oil from *A. pimpinella* is official, their remarks would not hold good. As regards the production of star-anise oil, although no precise figures are available, we would not put it as high as 1,400 cases per year by a long way.—*Chem. and Drugg.*

New Process for Hardening Plaster of Paris.

THE French Academy of Sciences, says *La Semaine des Constructeurs*, has 'just received a communication from M. Julte on a new process of hardening plaster so as to adapt it to the construction of flooring in place of wood, and to other purposes [such as plaster splints, for instance, for which reason we publish this paper.—ED. AM. D.] for which it cannot be used in its ordinary state on account of its want of hardness and resistance to crushing.

M. Julte recommends the intimate mixture of six parts of plaster of good quality with one part of finely sifted, recently slaked white lime. This mixture is employed like ordinary plaster. After it has become thoroughly dry, the object manufactured from it is saturated with a solution of any sulphate whatever whose base is precipitated in an insoluble form by lime. The sulphates best adapted for the purpose, from every point of view, are those of iron and zinc.

With sulphate of zinc, the object, at first greenish, finally assumes through desiccation the characteristic tint of the sesquioxide of iron. The hardest surfaces are obtained with iron, and the resistance to breakage is twenty times greater than that of ordinary plaster. In order to obtain a maximum of hardness and tenacity, it is necessary to temper the limed plaster well in as brief a space of time as possible, and with no more water than is strictly necessary.

The plaster cast, or other object to be hardened, should be very dry, so that the solution employed may penetrate it readily. The solution should be near the point of saturation, and the first immersion should not exceed two hours. If immersed too long, the plaster would become friable.

The proportions of the lime and plaster are arbitrary, and may be varied according to the results to be obtained; nevertheless the proportions of one to six have given the best results.—After *Scien. Amer.*

Hydrometers for Weight of Alcohol.

THE German Federal Council has authorized the use of hydrometers for *weight* of alcohol, besides those hitherto in use, which were graduated for volume. The new instruments are verified by the Government Bureau of Standards (Normal-Aichungs-Commission).

Tables which show the corresponding values of the weight-alcoholometer and that for volume are about to be issued. [It will be easy for any one residing in this country to obtain not only the official instruments, but also the tables, by giving an order for the same to some importer of chemical apparatus.—ED. AM. DRUGG.]

In order to distinguish the new instruments, they will be marked with two red stripes upon the scale of the thermometer. Each set will consist of three spindles, one giving alcoholic percentage from 0 to 10 (exclusive) in whole numbers; the next, from 10 to 65 (exclusive), in whole numbers and half per cents; and another from 65 upwards, in whole and ½ per cents. The first spindle has a centigrade thermometer graduated from 0 to 25° C.; the second and the third ones from — 12 to + 30° C.

The new alcoholometers are made and sold by the glass works of the United Spirit Manufacturers (Glasbläserei des Vereins für Spiritusfabrikanten), of Berlin, at 12 marks for No. 1 and 2, and 20 marks for No. 3. Case, floating cylinder, etc., are extra.—After *Dingler's Pol. Jour.*, 271, 421.

Commercial Note on Cascara Sagrada.

MESSRS. SCHOELLKOPF, HARTFORD & MACLAGAN, limited, of New York, send the following communication on cascara sagrada to the *Chemist and Druggist:*

The source of supply of the true thin genuine cascara was originally the northern portion of the State of California, but as the demand soon outgrew the supplies in this district, other sections were drawn upon, and of late years the bulk of the bark sold as thin Californian cascara has really been drawn from Coos County, Oregon, the shipping port being Marshfield. Considerable quantities also came from points further north in Oregon, the port being Portland. As nearly all the supplies from these districts reached the consuming markets *via* San Francisco, they were described as Californian bark. What is now known as Oregon cascara (the thick bark in long quills) really comes from Washington Territory, being collected as far north as Puget Sound, the principal shipping depot being Seattle. The terms Californian and Oregon used in describing these barks being misleading, it will be found preferable to change them to southern thin and northern thick bark. The thick bark, manufacturers here admit, is equally as good therapeutically as the thin, but the latter, being hitherto plentiful and cheap, naturally got the preference. When broken into small pieces the thick bark presents a handsome appearance, and will, we think, in the future sell equally as well as the thin. Some stress is laid on the color of the inside of cascara, but we do not attach any great importance to this, for all depends on the drying; buyers prefer the light buff color, but a walnut shade is, in our opinion, no detriment to the bark if sound. What was first known as spurious cascara is now recognized as genuine cascara, but collected in the winter out of season. It will be convenient to call these grades "winter" cascara. That described by Mr. Moss as No. 2 cascara "out of season" is thin southern bark cut off the branches with spokeshaves. This has received considerable attention of late, fully 5,000 lbs. finding its way into consumption in the States, advancing from 1*s.* 6*d.* to 2*s.* c. i. f. There is only a small quantity available now, and it is doubtful if more can be had as the collection was discouraged, dealers saying it was unsalable. The kind described by Mr. Moss as No. 4 cascara "spurious" came from Washington Territory, and is, therefore, of the thick variety. From what we can learn, some of this was obtained by steaming the branches, to soften the bark, and then cutting it off with knives. It does not appear to be as well dried as the No. 2, and, in spite of interested parties loudly proclaiming it as good as true bark, competent authorities consider it almost inert. In New York there are about 20,000 lbs. of this grade in store, which could probably be had at about 1*s.* 3*d.* to 1*s.* 6*d.* per lb. c. i. f.

The consumption of cascara is on the increase, both at home and abroad, and we place it to-day at 300,000 lbs. per year. The European demand has increased enormously, and is fully 120,000 lbs. at present.

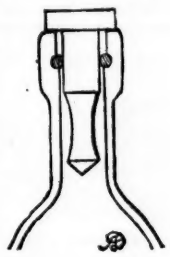
The total stock available in the States to-day of true cascara is less than 1,000 lbs., and a very serious question arises as to what is to be done till next August.

With regard to the new season, we would say that ample supplies will be forthcoming, although at considerably higher rates than formerly. Prices of 1887-'88 were unremunerative to all concerned, and buyers need not expect to see 35*s.* per cwt. again. Previously the bark could be collected by anybody, but now the owners of the districts where it is obtained, being alive to its value, are already demanding considerable sums for the privilege of gathering. Worst of all, the high price cascara has reached this year will cause the speculator, who hitherto has had nothing to do with it, to watch closely and "corner" the crops, if price goes low enough; in fact, a great many outsiders may be expected to go into the business, and we fear considerable speculation will result.

A NEW BOTTLE-STOPPER.

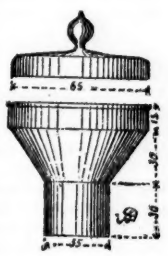
THE *Bayr. Industrie u. Gewerbeblatt* (1889, 26) describes a new and simple method of closing bottles hermetically.

The bottles and stoppers, in this case, must be specially made. The former possess a neck having a circular groove a short distance from the orifice, and slightly contracting towards the anterior. The stopper, which is of glass, has a stout head, to permit its being firmly grasped, and a body the shape of which is best understood by examining the cut. Previous to the insertion of the stopper, a rubber ring of suitable calibre is slipped over the contracted part of the stopper and the latter then pushed into the neck of the bottle. As the outer margin of the rubber ring passes the edge of the neck, it slides upwards along the stopper, until it passes over the straight portion of the body, and on further depression of the stopper, the rubber ring is caught by the circular groove. In this manner a perfect closure of the bottle is accomplished. As there is no *point d'appui* for any moderate pressure of gas, if confined within such a bottle, to exert pressure upon, such bottles may be used for the storage of liquids charged with gas at moderate pressure. When the stopper is pulled out the ring eventually encircles the contracted part of the stopper, and when the latter is entirely withdrawn the slightly expanding end of the stopper helps to prevent the slipping off of the rubber ring.



GLASS CASE FOR FILTERS.

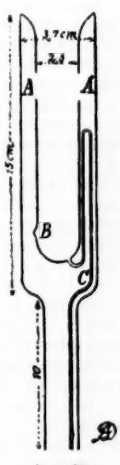
C. REINHART reports that he has used, for some years past, the apparatus here shown for drying and weighing paper-filters. It is a glass box, the upper part of which has the form of a funnel, and which may be closed by a well-ground cover. The filter is first thoroughly dried in the open box, and the latter then closed with the lid, which is, of course, dried in the hot chamber at the same time. After cooling in the desiccator, the whole is weighed. When the filter has been used for collecting precipitates, etc., it is partly dried, until it can be lifted out of the funnel, then transferred to the glass box, and the drying completed. The box is then covered, allowed to cool, and weighed.



As there are often little films adhering to the insides of beakers, funnels, etc., due to minute portions of precipitate which can only be detached mechanically, the author recommends to weigh, together with the original filter, a piece of another one or some clippings of filtering paper, which may afterwards be used for wiping off the adhering film, and which are dried and weighed afterwards with the main filter.—*Zeitsch. f. ang. Chem.*

IMPROVED EXTRACTION APPARATUS.

B. BLOUNT has devised an extraction apparatus, in which the delicate and fragile parts, which are usually situated externally, are placed inside of the outer wall, in fact between two walls, so that the risk of breakage is reduced to a minimum. The accompanying sketch gives the dimensions of the apparatus in cubic centimeters. The upper part of the apparatus is double-walled; between the two walls passes the bent siphon-tube C. The hot vapors from the flask pass up and out, through openings at A, into a condenser to be attached above (but not shown in the cut.) The condensed menstruum (ether, etc.) falls back upon the substance to be extracted, packed in the inner tube, and the saturated liquid is periodically and automatically drawn off by the siphon.—*Anal.*, 1888, 126.



Boric Acid not a Constituent of Milk.—Since boric acid has been found by Soltsien and others to be a regular constituent of the ash of wine solids, its presence has been looked for and partially established in many other ash residues. Lippmann, for instance, found it in the ash of sugar beets (both leaves and root), which is besides remarkable on account of its containing rubidium, cæsium, manganese, copper, and vanadium, the presence of which, however, must depend mainly upon the nature of the soil upon which they are grown. Eckenroth has fed cows with beets in which the presence of boric acid had been demonstrated, but was never able to find it in their milk. It is, therefore, certain that it is eliminated by other channels.

Preparation of Dextrin.

ACCORDING to Klepotschewsky, the best process for preparing dextrin is the following:

	Parts
Potato Starch	400
Water	200
Hydrochloric Acid, sp. gr. 1.14	5

Mix them thoroughly, dry the mixture, by exposure to the air, during about two days, at a moderate temperature, then heat the mass, first on a water or steam-bath, and lastly for about half an hour in an oven at a temperature of 110° C.

Dextrin thus prepared leaves a slight residue behind; when it is dissolved in water, it slightly reduces Fehling's solution. But the same is the case also with dextrins made by other processes.—After *Chem. Zeit.*

Tape-Worm Pills.

BETTELHEIM some time ago recommended, as a convenient [?] remedy for tape-worm, to administer a decoction of pomegranate bark by means of an œsophageal tube. But as the remedy often causes nausea, he now recommends to prepare pills of the following, which are to be coated with keratin:

Ethereal Extract of Male Fern	160 grains.
Extract of Pomegranate Root Bark	160 "
Jalap, powdered	48 "

Make 70 pills, and coat them with keratin (which causes them to pass the stomach undigested, while they will be dissolved in the intestinal canal).

An adult patient is to take 15 to 20 of these pills on the "fast-day" preceding the day of treatment. On the latter, he is to take the remainder of the pills, within two or three hours. On the preceding "fast-day," he is also to take a purgative enema.

Hydroxylamine in Skin Diseases.

THE suggestion of Professor Binz to introduce hydroxylamine as a substitute for pyrogallic and chrysophanic acids has been practically taken up by Dr. Eichhoff, who reports enthusiastically on this new drug. He used the following formula:

Hydroxylam. Hydrochlor.	gr. ij.
Spirit. Vini	ʒ ij.
Glycerin	ʒ ij.

S. For external use.

The affected parts of the skin, after being first washed with soft soap, are painted with this solution from four to five times a day. The alcoholic solution has the advantage of penetrating the skin much more rapidly than if ointments were used as a vehicle. Application of stronger solutions than one per cent requires caution. Hydroxylamine has been used by Dr. Eichhoff for ringworm and the disease in close relation to ringworm called sycosis parasitaria, and also in cases of lupus vulgaris; especially with the latter his success was remarkable. He also recommends the drug for treating psoriasis and parasitic eczema.—*Chem. and Drugg.*

The Solubility of Permanganate of Potassium.

IN the course of an investigation of the constitution of permanganate of potassium, Mr. Charles M. Bradbury made a series of careful experiments to re-determine the solubility of permanganate of potassium in water, and his results deviate more or less from those formerly obtained.

He finds that at 0° C. and 5° C. and between these degrees, the results obtained were extremely uniform, no matter what method of producing a saturated solution was employed. Above 5° C. there was a slowly increasing degree of variation in the results according as the method of making a solution was changed. Nevertheless, below 35° C., the results were not materially different. Above this temperature, however, the difficulties increased. The method employed by the author to produce the saturated solutions upon which the final results were based, was the following:

A flat porcelain dish, about 6 Cm. deep and 25 Cm. in diameter, was covered outside with cotton-wool and heavy paper, and fitted with a wooden cover. The permanganate was placed in a small beaker, in sufficient quantity to insure saturation of the solution, and the beaker was immersed in the bath in the dish through an opening made in the cover to fit it. The temperature of the bath was shown by a thermometer, introduced through the cover, and that of the solution by another suspended in it. Starting at 0° C., the temperature was gradually raised by removing the ice and adding warm water, till 30° C. was reached; from which point the increase was continued by the aid of a jet of steam led through the cover into the bath. At every 5 degrees' rise in the temperature of the solution, 5 C.c. were removed to a weighed vial, which was then set in a steam-bath to evaporate. The solution was stirred, and then given time for the undissolved salt to subside, previous to the removal of each sample.

Following are some of the results obtained:
100 C.c. of a saturated solution of the salt contain

At	Gm. of Salt.	At	Gm. of Salt.
0° C.	3.0	40° C.	10.6
5° "	3.3	50° "	13.7
10° "	4.0	75° "	22.8
15° "	4.9	90° "	28.6
20° "	5.8	95° "	32.8

—After *Chem. News*, March 29th.

Uralium: A New Hypnotic.

GUSTAVO POPPI, a medical student of Bologna, recently described to the Medico-Chirurgical Society of that city the effects of a new hypnotic produced by the combination of chloral hydrate with urethran. From experiments on animals and on the human subject he concludes that this substance—*uralium*—induces sleep more quickly and more certainly than any other known hypnotic. It causes no bad effects of any kind. It has been given in cases of heart disease and nervous complaints with the best results, even when other hypnotics had failed. The *British Medical Journal* says that experienced practitioners will recognize in Signor Poppi's enthusiastic account of his discovery the familiar trumpet-blast that heralds the first appearance of so many new remedies, "which have their day and cease to be," or which, at any rate, soon lose their title to therapeutic infallibility.—*Chem. and Drugg.*

Adulteration of Sherry in Spain.

THERE are two kinds of wine merchants who ought not to be confounded; these are the wine-growers and speculators in wine on the spot, who are in reality those who form the market prices; the others are the "extractors," and these are the shippers to foreign markets; they make their purchases from the former, and prepare and blend their wines in a great variety of styles for the particular demand of the market each kind is intended for. For instance, there are markets which require a very pale sherry, and a gold or brown sherry would not sell at any price, whilst at others it happens the contrary and a very pale wine would not find buyers. There are many other specialties, such as more or less dry, more or less body, sweetness, taste, etc., in fact, each adapted for a different market; but these wines cannot be considered to form the market value of this place, and for said reason it is necessary to take the prices from the first-stated merchants. That is what the shippers do, or pretend to do, when they present their invoices, which represent the original cost of the wine and the corresponding expenses of preparation from the date of the purchase, which appears reasonable.

This is observed in the majority of shipments for New York, where the largest quantity consumed is of very low grade. It has been considered generally that low sherries cannot be fit for shipment until the third year, and so it would be if left entirely to nature; but such wines in the hands of intelligent persons in the matter, by repeated fining and raking off, reinforcing well with alcohol, and other operations adopted by wine merchants, have, in fact, of late been shipped within the second year. A great part of the wine shipped is not above twelve months, and this is the sweet or checked wine, of which a good portion enters into the combination of low sherries.

The sweet wine is made thus: During the vintage, and after the grape is pressed, they put 25 gallons of alcohol or spirits of about 66 per cent overproof to a butt, and the rest is completely filled with the must or juice of the grape, and bung made fast. The spirits stop the fermentation of the wine, which then becomes perfectly sweet. This wine can be got ready for shipment within twelve months or less, but, as I have already stated, it is only used as an auxiliary for the preparation of wines.

In general the low-priced sherries are blended or composed of four or more different sorts, viz., alcohol or spirits, sweet wine, which I have described above, colored wine, cheap new wines of different kinds, and sometimes of a few gallons of older wines to help the whole to an older appearance. Fine sherries, on the contrary, are kept in their natural state of very pale and dry for six or seven years and sometimes longer, and these wines, which, from their first growth, are costly and become still more so by the length of time required, are very frequently disapproved by such as find other sorts of wine more to their taste, and worth, perhaps, the tenth part of the above stated varieties.

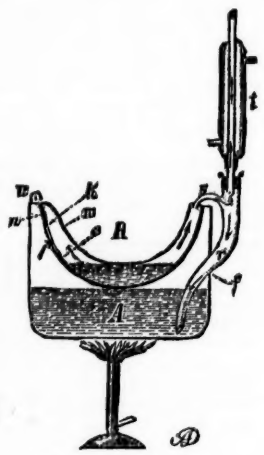
Another way, and the best way, to "forward" wines is by the use of "soleras," or, as I should say, mother-wines. The said soleras are a number of butts of old wines more or less good, but always old; these butts of wine to be made use of are generally half full, the other half being filled with a new wine which, in the course of a very short time, gets so forwarded that it becomes an "old" wine under that treatment. A quantity is then taken from each butt to be made use of in the preparation of wines, and that quantity taken off is again replaced with new wine to let it grow again in the same manner. The same way of carrying on the business is hardly to be found in any other country, or even in any other part of Spain.—*Report of U. S. Acting Vice-Consul* ANT. J. BENSUSAN *at Cadiz.*

A NEW CONSTANT-LEVEL WATER-BATH.

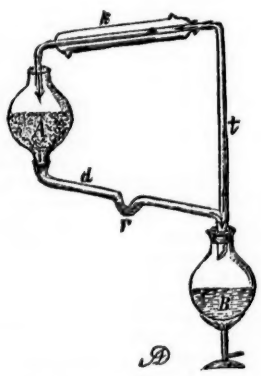
UPON a square-bottomed copper vessel A (see cut) is soldered a semi-globular double-walled copper vessel B. The two chambers can communicate only by the passage shown in the cut, and by a narrow slit in the inner bottom of the vessel R, between the points marked respectively *k* and *e*. At U a tubulure is situated, through which the vessel A may be filled until the liquid just touches the bottom of the upper curved vessel. When heat is applied, the generated steam is compelled to make its way (in the direction of the arrows) through the beforementioned slit, and coming in contact with the cooler walls of the double chamber, is partly condensed, and partly carried forward, until it is returned to a liquid state by passing up the condenser *t*, whence it flows back into the chamber A. Not only is there a constant level preserved, but the apparatus has the further advantage that the liquid to be evaporated does not come at all in contact with vapors arising from the water-bath. The apparatus has been devised by Mr. P. N. Raikow.—*Chem. Zeit.* and *Chem. Centralbl.*

A NEW DRYING-OVEN.

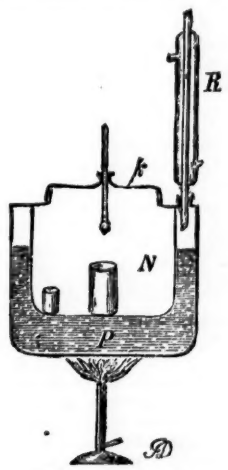
THIS is constructed somewhat on the principle of the constant-level water-bath designed by the same chemist, viz., P. N. Raikow, at least so far as there is a condenser connected with the apparatus, which prevents the escape of vapors. The oven is a square two-walled box, which, instead of a door at the side, has a lid on top, through which passes a thermometer.—*Chem. Zeit.* and *Chem. Centralbl.*



Raikow's water-bath.



Raikow's ether-extractor.



Raikow's drying-oven.

A NEW ETHER-EXTRACTOR.

THE apparatus here described is proposed by P. N. Raikow.

B is the flask to which heat is applied. The vapors of the menstruum rise through *t*, pass into the condenser *k*, and from there the condensed liquid falls upon the substance to be extracted, which is contained in the extraction vessel A, whence the saturated liquid runs down the tube *d*, which is provided with a trap *r*, the object of which is to prevent the passage of the hot vapors in the direction of *r d*.—*Chem. Zeit.* and *Chem. Centralbl.*

On Hygrine.

REGARDING the nature, and even the very existence, of *hygrine*, the reputed companion of cocaine in coca leaves, there have existed up to the present time very diverging opinions. Even Hesse, who might have been supposed to have special facilities for collecting such a by-product, only succeeded in collecting a few grammes, which were manifestly insufficient to make a thorough study of the substance. Prof. C. Liebermann, however, has had a better opportunity, having received from his friend, Dr. Giesel, about one pound of the substance, which had been obtained by Lossen's process with only slight modifications.

Hesse assigned to hygrine the composition $C_{13}H_{13}N$, and regarded it as trimethyl-quinoline. Liebermann, however, finds that it is a complex mixture of oxygenated bases, provided that his own and Hesse's "hygrine" were identical.

The hygrine examined by Liebermann appeared in form of a dark-colored, oily liquid, of an odor resembling piperidine and nicotine, having a strongly alkaline reaction and almost wholly soluble in water. As it is liable to suffer decomposition when overheated, Liebermann treated it in the following manner:

The crude material was dissolved in absolute ether, the ethereal solution separated from a layer of water which collected below, and sticks of solid potassa added to it so as to absorb the rest of the water and any carbonic acid which had been attracted from the air. This solution was freed from ether by distillation, and the residue distilled under a vacuum of 45 to 50 millimeters of mercury, under which circumstances the bases passed over undecomposed. It was soon noticed that the latter passed over in two main portions, one boiling (at 50 Mm. pressure) at 128°–131° C., the other at about 215° C. There not being enough material to examine other fractions, Liebermann restricted his examination to the two main portions.

The lower boiling base was found to have the composition $C_8H_{15}NO$. The higher boiling one has probably the composition $C_{14}H_{24}N_2O$.

It is evident, therefore, that the statements heretofore made regarding hygrine will have to be corrected.

Antipyrin and Spirit of Nitrous Ether.

A VALUABLE contribution to our knowledge of the reaction occurring between antipyrin and nitrous ether has been furnished by Drs. H. C. Wood and John Marshall. They have gone thoroughly into the chemistry of the subject, preparing the iso-nitroso-antipyrin by adding the calculated quantity of potassium nitrite to an acidulated aqueous solution of antipyrin. The liquid became at once bluish green in color, and in a few minutes there was abundant production of crystals. It was noticed that the filtrate from the crystals changed in color from green to brown, and developed a very distinct hydrocyanic acid odor after standing a few hours. The presence of cyanogen was proved, and it was further ascertained that dilute sulphuric acid, hydrochloric acid, and acetic act upon solutions of iso-nitroso-antipyrin, causing the evolution of cyanogen. The same is the case with mixtures containing spirit of nitrous ether and antipyrin. The decomposition may occur in the stomach, and this was demonstrated by adding iso-nitroso-antipyrin to a 0.2 per cent solution of hydrochloric acid, and keeping the whole at the temperature of the body in a water-oven. The quantity of cyanogen evolved is, however, so slight that no danger need be feared. The amount given off in an hour from 0.5 Gm. of iso-nitroso-antipyrin, mixed with 50 C.c. of the 0.2 per cent acid solution, is only sufficient to give a few crystals of argentic cyanide with argentic nitrate on an inverted watch-glass, equivalent, possibly, to less than one hundred-thousandth part of a grain of hydrocyanic acid. In determining whether the iso-nitroso-antipyrin possessed toxic properties, it was administered under various conditions to dogs and rabbits, but in no case were the slightest untoward effects observed.—Abstract from *Therap. Gaz.* in *Chem. and Drugg.*

Treatment of Sea-sickness.

DR. SKINNER is one of the latest claimants of a cure for sea-sickness. He reports that he has obtained good results by the simultaneous employment of atropine and strychnine, or by that of caffeine. He used the following solutions (proportions recalculated from metric formula):

I. Atropinæ Sulphatis	gr.	½
Strychninæ Sulphatis	gr.	½
Aquæ Menth. Pip	fl.drch.	10

To be used hypodermically.

II. Caffeinæ	gr.	64
Sodii Salicylatis	gr.	48
Aquæ Destillatæ	℥	160

Dissolve with the aid of a gentle heat. To be used hypodermically.

In the majority of cases, the administration of 1 Gm. of either solution allays vomiting, dispels nausea, headache and dizziness, and causes quiet sleep in from one-half to three-quarters of an hour. Pills prepared with the two alkaloids of formula No. I. and taken at the first approach of the symptoms of the disease, prevent its development. —*Med. Chir. Rundschau, J. de Pharm.*

"Commercial" Lard.

THE lard trade of America has assumed very large proportions. It was stated in evidence before a commission recently appointed by the United States House of Representatives to inquire into the question of lard adulteration, that about 270,000 tons are annually produced in America, upwards of one-half of which is exported to other countries. Amongst the American lard packers there are several who prepare and supply only pure lard, but it was stated before the same commission by one of the largest producers that three-fourths of the American lard was packed by his firm and a few other large firms, and that these firms, "in order to keep up the quality and to meet the demands of the trade, added cotton-seed oil and oleomargarin-stearin" to their lard. This lard is all branded and sold as "Refined Lard," "Pure Refined Lard," and by other names calculated to lead the purchasers to believe that the lard is genuine, pure lard. The cool way in which this perversion of the ordinary meaning of the word "Refined" is defended, is amusing. To the question, "Do you think that if there were only 20 per cent of lard in your compound, it would be right to brand that as refined lard?" the same witness answered, "Yes, sir. After we have been putting up lard for 25 years, we claim to become expert in the manufacture of an edible lard for domestic purposes. If we consider that we can make an article that meets the demand of our trade, fulfils the wants of the trade, and is pure and wholesome and valuable, and can put in 50 or 60 per cent of cotton-seed oil and harden it with 20 per cent of lard (beef stearin?) to make it firm, it meets the demand of our trade. That is all they want. We know what they want better than they do themselves. . . . If we choose to say we are willing to put in our brand of refined lard only about 20 per cent of lard, we consider it perfectly fair to do it."

The beef stearin used is a by-product of the margarin manufacture, and consists of the harder part of the beef fat from which the oleomargarin has been separated by pressure. Its price was recently about 36*s.* per cwt. The price of cotton-seed oil was about 23*s.* per cwt. The price of lard was about 47*s.* per cwt. It will thus be seen that there would be a large margin of profit if a compound consisting of 50 or 60 per cent of the cheaper cotton-seed oil and beef stearin could be sold at the price of genuine lard; and this is probably the clue to the true explanation of the adulteration.

Lactate of Quinine for Hypodermic Use.

AT a recent meeting of the Paris Society of Pharmacy, M. Vigier read a note on lactate of quinine for hypodermic injections. The combination—an excellent one for the purpose—seems to have fallen into an unmerited discredit, because the chemical supplied by dealers is not soluble in three times its weight of water, as the Codex says, but requires ten times. M. Vigier said the sparing solubility is owing to the use of the crystallized lactate. A good plan is for the pharmacist himself to prepare his lactate solution, and to keep it as such. The following formula is a convenient one:

	Grammes or parts.
Sulphate of Quinine	21.35
Water	400.00
Sulphuric Acid (10 per cent)	25.00
Ammonia	15 to 20.00
Lactic Acid	sufficient or 5.00

Dissolve the sulphate of quinine in the sulphuric acid and water, precipitate with the ammonia, wash, collect the alkaloid magma in the usual manner, and, while it is still moist, place it in a porcelain dish with about 100 grammes of water heated to 80° C. Now saturate it with sufficient lactic acid, evaporate the liquor to 100 grammes and filter. Keep for use in a vial closed with a glass stopper dipped in paraffin.

The solution contains for each 5 grammes (or parts), 1 gramme (or part) of lactate of quinine, and will keep unaltered for years.

At the same time M. Vigier added that recently a manufacturer of chemicals, having heard of his researches on quinine lactate, sent him a specimen of the chemical guaranteed to be pure and to dissolve in three times its weight of water. The salt was soluble as claimed, but its purity had not yet been tested. A noticeable feature was that the lactate in question is not crystallized, but amorphous. The worst about it, however, is that 20 centimes a gramme was the price charged, while the home-made solution costs only one-fifth of the amount. Consequently, pharmacists are strongly advised to make their lactate themselves.

While the *solubility of quinine lactate* was under discussion, the general opinion prevailing was that the salt becomes less soluble on being evaporated and crystallized; also that much of the lactate offered by wholesalers is merely sulphate dampened with a little lactic acid. The statement of the Codex respecting the solubility of quinine lactate having been found fault with, Professor Marty, who was on the Pharmacopœia Committee, remarked that they had at the time apparently good reason for what they had said. A specimen of crystallized lactate supplied by Milan manufacturers did answer this test. Professor Jungfleisch had been informed that the chemical was made by saturating an ethereal solution of quinine alkaloid with lactic acid, dissolved also in ether, and evaporating without heat. The truth of the statement could not be ascertained at the time, and consequently no process was given in the Codex. But, on the whole, it agrees well enough with the facts elicited during the discussion.—*Chem. and Drugg.*

Improvement in the Manufacture of High-grade Glucose.

COMMERCIAL glucose usually consists of about 66 per cent of fermentable sugar, 18 to 20 per cent of unfermentable, organic constituents, the rest being water. The low percentage of dextrose has hitherto prevented its practical employment in many branches of industry. This drawback is likely to be overcome by the improved process for preparing grape-sugar, devised by Alfred Seyberlich, of Riga. One of the main improvements in this process is the use of nitric in place of sulphuric or other acids. Nitric acid had, indeed, been already recommended by others, but no practical results appear to have been attained by them.

The new process is carried on in open boilers without pressure. The relative proportions of ingredients are:

Starch	100 parts
Water	200 "
Nitric Acid	½ per cent

of the starch (from rice, Indian corn, etc., etc.) calculated as air-dry.

These ingredients are boiled in the usual manner, the liquid then neutralized, rendered faintly alkaline, and filtered by means of a filter-press. The resulting filtrate is evaporated to a density of 35° B. (taken while hot), and transferred at a temperature of 18° C. (65° F.) to copper pans, where it is frequently stirred and allowed to crystallize. The crystalline mass is pressed in coarse linen bags, yielding cakes which contain about 88 per cent of pure sugar, 10 p. c. of water, and 2 p. c. of impurities. This is "raw sugar."

The clear syrup, which has been removed by pressing, is repeatedly concentrated, so as to obtain more crystals, and the final molasses freed from nitric acid and salts by means of sulphurous acid.

For the purpose of refining the raw sugar, the cakes are melted in a copper boiler, with the addition of enough water to make a solution of the density of 32° B. (while hot). For every 100 parts of sugar 10 parts of animal charcoal are then added, the whole well stirred and heated to 80° or 90° C., and afterwards passed through the filter-press. The resulting colorless syrup is set aside to crystallize, yielding a brilliant white, crystalline mass, which is freed from mother-water by pressure. The latter is again concentrated and a fresh crop of crystals obtained.

If the sugar thus refined and pressed is crushed or ground, the product will form a salable, white, crystalline "farina-sugar." To obtain larger and better developed crystals, the cakes are melted on a water-bath at 80° to 90° C., the melted mass poured into the usual forms, and allowed to crystallize during 48 hours at 18° C. When the mass is dry it represents *pure hydrous* glucose, containing 90 per cent of dextrose and 10 per cent of water.

Anhydrous, or practically anhydrous, glucose is prepared by melting the hydrous cakes over an open fire to boiling, cooling, adding a few crystals of anhydrous grape-sugar, and allowing to stand 24 hours. The resulting crystals contain 98% of glucose and 2% of water. By crushing and sifting this, a product is obtained which is very similar to cane-sugar.

The author states that 100 parts of anhydrous starch will yield from 95 to 100 parts of glucose.—After *Dingler's Pol. J.*, 271, 512.

Oil of Eucalyptus in Phthisis.—Dr. Philip recently reported to the Edinburgh Medico-Chirurgical Society that he had for eighteen months employed eucalyptus oil in conjunction with cod-liver oil in the treatment of phthisis, and had obtained good results. The oils were administered as an emulsion, devised for him by Messrs. Baildon & Son, which contained 75 per cent of cod-liver oil and 5 minims of eucalyptus oil in each drachm. The latter disguises the taste of the cod-liver oil in a remarkable degree.—*Chem. and Drugg.*

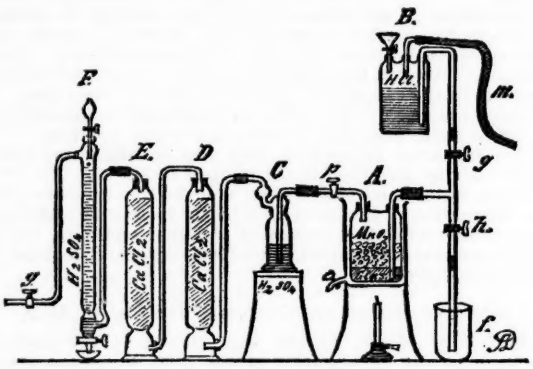
Voice Lozenge.—According to the *Chem. and Drugg.*, Dr. Hinkle recommends the following formula as the best for a "voice lozenge" in the ordinary hoarseness of singers and speakers. A small piece should be allowed to dissolve in the mouth just before vocal exertion:

Cubebs	½ grain.
Benzoic Acid	⅓ "
Hydrochlorate of Cocaine	1/10 "
Powdered Tragacanth	½ "
Extract of Licorice	5 grains.
Sugar	13 "
Eucalyptol	½ minim.
Oil of Anise	1/20 "
Black Currant Paste	enough to make 20 grains.

A CONTINUOUS CHLORINE GENERATOR.

THE apparatus here described has been devised by A. Vosmaer, and is suitable for a continuous generation of chlorine gas.

The generator A consists of a two-necked Woulf's bottle, the bottom of which is covered with a layer of coarse pieces of glass or pumice, over which is placed a layer of best manganese dioxide in pieces of about the size of a pea. The hydrochloric acid requisite for generating chlorine gas is supplied by a siphon from a reservoir B situated at a higher level. A water-bath surrounds the Woulf's bottle, so as to permit the application of the proper degree of heat. The cylinders C and F contain sulphuric acid, and the two intermediate ones, D and E, chloride of calcium in lumps, all of which serve to thoroughly dry the gas.



When the apparatus is to be set at work, stop-cock *h* is closed, and *p* and *g* are opened, whereupon acid will flow from the reservoir into the generator. This may be hastened by blowing through the tube *m*. The amount of chlorine gas given off may be regulated by the size of the gas-flame. When the current is to be interrupted, the stop-cocks *p* and *g* are closed, and *h* is opened, whereby the liquid in the generator is driven over by the pressure of gas into the beaker *f*, from which it may be re-transferred to the reservoir, if it be still of proper condition.—*Zeitsch. f. anal. Chem.*, 1888, 638.

Fatal Poisoning by Carbon Monoxide.

PROF. W. P. MASON reports a remarkable case of poisoning by carbon monoxide in the Journal of the Amer. Chem. Soc.

In Troy, N. Y., on January 6th, 1887, owing to a break in the street mains, a quantity of "fuel gas" (see analysis below) passed beneath the frozen crust of earth and found its way into the adjoining houses. Three deaths and many more or less serious illnesses resulted.

The following points from the testimony of the physicians who made the autopsies are to be noted:

The expressions of the deceased were placid. One victim, an old woman, was found seated in a chair holding her false teeth in her hand. The second, also a woman, lay upon the floor. The third, a man, sat upright on a lounge, his head reclining on his shoulder. The fire was burning in the stove, and the lamps were still burning on the table. When found, death had not been very recent, as *rigor mortis* was fully developed.

Very searching autopsies were made, with the result of finding nothing whatever abnormal, with the exception of the bright cherry-red color of the tissues, and the vivid redness and lack of coagula in the blood.

Upon opening the chest cavity the physician bent forward and took one or two long whiffs for the purpose of determining the presence of any odor. Almost immediately he was seized with giddiness and great oppression in the epigastrium, so much so that he had to discontinue his work for half an hour. The effects did not finally wear off until after an interval of about twelve hours.

The painful oppression in the chest, the giddiness, and the subsequent headache experienced by this physician call most forcibly to mind the symptoms described by Sir Humphry Davy when he so rashly experimented upon himself with carbon monoxide.

A lawsuit naturally growing out of these cases of poisoning, I was called upon to give the chemical constituents found in the said "fuel gas," and the results are appended. I also experimented upon animal life with carbon monoxide mixed with air, obtaining results confirmatory of observations already made, that death usually takes place very quietly, although occasionally with convulsive movements. Chickens and rats were the two forms of life employed.

Blood, treated with carbon monoxide, I found to assume a bright red, almost carmine, color, which did not alter on exposure to air for a number of days.

Finally, in February, 1888, a bottle of blood taken from the heart of one of the victims at the time of the autopsy was submitted to me for examination. The bottle was closed with a tight cork. Although over a year old, and possessing strong odor of decomposition, the color still remained of the brilliant, vivid red noted at the time of taking the specimen. Under the microscope but very few corpuscles remained to be seen, their structure having almost completely broken down.

Examination by the spectroscope revealed the two absorption bands near the line characteristic of the presence of carbon monoxide in combination. These bands, although very like those indicative of oxy-hæmoglobin, may yet be readily distinguished by their location only, particularly if a sample of blood artificially treated with carbon monoxide be at hand for purposes of comparison.

The space between the bands is, moreover, much less clearly lighted than in the case of oxygenated blood. As a confirmatory test, the blood under examination was treated with solid potassium sulphide, and the absorption bands found unchanged thereby—the bands of oxy-hæmoglobin, as is well known, change under such treatment to the single dark band midway between the positions of the former ones.

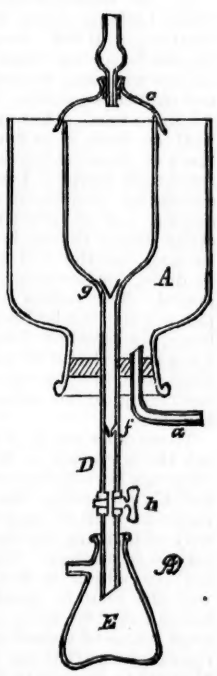
What is of special interest in this case is the ready detection of carbon monoxide in the blood after so long an interval of time.

At the present moment, nearly two years from the date of the accident, the blood still retains the characteristics noticed when first examined.

CRYSTALLIZATION BY COLD.

WHEN it is desired to cause the separation of crystals from the solvent liquid by means of cold, under conditions which make it possible to exclude moisture or air, and to free the crystals from adhering mother-liquid, the apparatus devised by J. W. Bruehl may be used.

This consists of a vessel A (of the shape of an inverted wide-mouthed bottle without bottom), the neck of which contains a doubly perforated rubber stopper, one perforation containing the drainage tube *a*, while through the other passes the stem of the glass freezing vessel. This stem is composed of two glass tubes fused together at *f*, the upper one being drawn out to a point, while the lower one contains a stop-cock *h*. The freezer (inside of A) is provided with a hermetically fitting glass cover *c*, which bears a chloride of calcium tube on top, and is closed with a piece of rubber tubing and pinch-cock. At *g*, a small platinum cone is inserted in the neck.



When the apparatus is to be used, it is connected with a receiver E, which itself is connected with the air-pump. A few drops of the liquid are first poured into the freezer so as to cause the platinum cone to adhere to the wall about the neck; then, the stop-cock *h* being closed, the vessel E is filled, and the cover tightly put on. The whole vessel is now pushed down into A as far as possible, and the freezing mixture carefully piled or packed around it. When the solidification or crystallization is completed, the chloride of calcium tube on top of the lid is connected with a supply of dry air, the faucet *h* opened, and the liquid portion drawn off by means of the air or filter pump. The current of dry air (or any other gas) may be passed through, until the crystals are dry. [If the crystals have a tendency to melt readily, the current of air may previously be cooled.]—*Ber. D. Chem. Ges.*, 1889, 236.

A Mexican Medical Man is causing a great commotion in Lima just now, according to a note in the *Chem. and Drugg.* Dr. Castellanos is the name he goes by, and he professes to hold some wonderful secret for diagnosing and expelling tapeworms. He has performed innumerable successful operations, and his receipts are nearly one thousand silver solés per day. By an observation of the patient's eyes he discovers the presence of the worm, and accurately estimates its dimensions. The great dons of medicine look upon him as a charlatan, and talk of punishing him for practising without a license, but they are jealous of his skill, say the daily records. From Lima Dr. Castellanos will proceed to Chili, and from thence to Paris, where he will compete for the great medical prize of 300,000 francs, won previously by Pasteur. Then we are to have him in England [and, of course, also in Uncle Sam's dominions].

Methods of Milk Analysis.

THE following is taken from the Proceedings of the Fifth Annual Convention of the Association of Official Agricultural Chemists, held at Washington in August, 1888, and contains the "Official Methods of Analysis of Milk."

Estimation of Water.

From a weighing-bottle take 5 C.c. milk, put in a weighed thin glass dish, or dish lined with tin-foil, one-third full of powdered asbestos; dry for two hours at 100° C. The temperature obtained in a boiling water-bath does not reach 100° C. The milk should be dried in an air-bath, the temperature of which is carefully controlled.

Alternate Method of Estimating Water.

Evaporate 1 to 2 Gm. of milk in a shallow watch-glass or platinum dish on the water-bath for thirty minutes. Dry for an hour at 100° C. and weigh.

Estimation of Casein.

Take 5 Gm. of milk in a Kjeldahl apparatus with 20 C.c. H_2SO_4, and estimate ammonia in the usual way.

Alternate Method of Estimation of Casein.

Rub up in a mortar the thin disc containing the dried residue from the above process, or remove the foil containing it, and transfer to the soda-lime combustion tube in the usual way.

The mortar and pestle must be well cleaned with the soda lime, and these cleanings placed in the tube.

Or the dish or tin-foil and its contents may be transferred to a digestion flask, and the casein estimated by the method of Kjeldahl.

Estimation of Fat.

Method of Adams.—The kind of paper and the method of using it first proposed by Adams are as follows:

As for material, the only extra article is some stout white blotting paper, known in the trade as "white demy blotting, mill 428," weighing 38 pounds per ream. This should be in unfolded sheets, machine-cut into strips 2½ inches wide and 22 inches long; each sheet in this manner cut into seven strips.

I have tried other papers, but none have answered so well as this; it is very porous and just thick enough. Each of these strips is carefully rolled into a helical coil, for which purpose I use a little machine made by myself, consisting of a stout double wire, cranked twice at right angles, and mounted in a simple frame. One end of the strips being thrust between the two wires, the handle is turned, and the coil made with great facility. This may be done, for the nonce, on a glass rod the size of a cedar pencil. Two points have to be carefully attended to; the paper must not be broken and the coil must be somewhat loose, the finished diameter being a little under an inch. I am in the habit of rolling up a considerable number at a time, and placing each within a brass ring as it is rolled, inscribing on one corner with a lead-pencil its own proper number.

These coils are next thoroughly dried, and I need hardly say the accuracy of the process depends on this drying. This can be satisfactorily done in an ordinary air-bath at 100° C., providing the bath be heated properly and the paper kept in it long enough. I have found the common way of heating the thin bottom of the bath with a single jet not to answer. My bath is placed upon a stout iron surface, which is heated by a large ring of jets; in this way the heat is evenly distributed over the whole of the bottom of the bath, and the papers, which are put in a cage frame of tinned iron wire 5 by 2½ inches, and divided into eight partitions, get evenly and completely dried, if allowed to remain in the bath all night, and weighed in a weighing-tube next morning, and their weights having been registered according to their numbers, stored away ready for use, as follows:

The milk to be examined is shaken, and with a pipette 5 C.c. are discharged into a small beaker, 2 inches high by 1¼ inches in diameter, of a capacity of about 30 C.c., weighing about 12 Gm. This charged beaker is first weighed, and then a paper coil gently thrust into the milk very nearly to the bottom. In a few minutes the paper sucks up nearly the whole of the milk. The paper is then carefully withdrawn by the dry extremity of the coil and gently reversed and stood, dry end downwards, on a clean sheet of glass. With a little dexterity all but the last fraction of a drop can be removed from the beaker and got on the paper. The beaker is again weighed and the milk taken got by difference. It is of importance to take up the whole of the milk from the beaker, as I am disposed to consider the paper has a selective action, removing the watery constituents of the milk by preference over the fat.

The charged paper is next placed in the water-oven on the glass plate, milk end upwards, and rough dried. Mismanagement may possibly cause a drop to pass down through the coil on to the glass. This accident ought never to occur; but if it does, it is revealed in a moment by inspection of the surface of the glass, and the experiment is thereby lost.

In about an hour it is rough-dried and in a suitable condition for the extraction of the fat.

The method of Adams has been thoroughly tried by the English chemists, and has received the approval of the English Society of Public Analysts. It gives uniformly about 0.2 per cent more fat in normal milk than the ordinary gravimetric methods.

The following modifications of the process may be used:

The blotting-paper is replaced by thick filtering-paper cut into strips two feet long and 2.5 inches wide. These are thoroughly extracted by ether or petroleum or alcohol.

One end of the strip of paper being held horizontally by a clamp or by an assistant, 5 C.c. milk are run out by a pipette from a weighing-bottle along the middle of the strip of filtering-paper, being careful not to let the milk get too near the ends of the paper, and to secure an even distribution of it over the whole length of the slip. The pipette is replaced in the weighing-bottle and the whole re-weighed, and thus the quantity of milk taken is accurately determined. The strip of paper is now hung up over a sand-bath in an inclosed space, high enough to receive it, where the air has a temperature of 100° C. (circa). In two or three minutes the paper is thoroughly dry. It is at once, while still hot, rolled into a coil, and placed, before cooling, in the extraction apparatus already described.

The fat is dissolved by ether or petroleum, collected in a weighed flask, and, after thorough drying, weighed.

The fat after extraction may also be estimated volumetrically as described in the method of Morse.

From data which have been collected, it appears that the estimation of the fat in milk by the lactocrite is strictly comparable with the results of Adams' method. Those who have this instrument, therefore, can use it instead of the method given.

Alternate Method of Estimating the Fat in Milk.

Method of Morse, Piggot, and Burton.—This method consists in the dehydration of the milk by means of anhydrous sulphate of copper; the extraction of the fat by means of the low-boiling products of petroleum; the saponification of the butter by means of an excess of a standard solution of potassium hydroxide in alcohol; and the determination of the excess of the alkali by means of a solution of hydrochloric acid. The following apparatus and reagents are required:

1. A porcelain mortar and pestle.
2. An extraction-tube, 14 or 15 Mm. in diameter, 220 Mm. in length, with funnel-shaped top. A straight chloride-of-calcium tube may be used for this.
3. A 200 C.c. Erlenmeyer flask, strong enough to be used with a filter-pump.
4. A suitable stand for holding the flask and extraction-tube.
5. Ten C.c. pipettes.
6. Weighing-glasses with ground-glass stoppers.
7. A low-boiling gasoline, distilling between 30° and 0° C.
8. Dehydrated sulphate of copper.
9. Semi-normal solution of potash in 95 per cent alcohol.
10. A semi-normal solution of hydrochloric acid.

Manipulation.—Place about 20 Gm. of the anhydrous copper sulphate, roughly measured in a copper spoon of the size to hold about that amount, in a porcelain mortar; make a cavity in the centre of the mass with the pestle. Allow 10 C.c. of the milk to run on to the copper sulphate, being careful that none of it touches the sides of the mortar. When the milk is nearly dry, grind the mass up with a little clean sand, transfer to the extraction-tube, gently pressing it down in the tube by means of a glass rod, the lower portion of the extraction-tube to be packed with clean cotton-wool. The fat is extracted in the following way: 15 C.c. of benzin are poured over the material in the extraction-tube and drawn down, with the aid of the filter-pump, until the whole of the mass to be extracted has become wet with the liquid, when the connection with the pump is closed; after about five minutes another portion of the 15 C.c. of benzin is poured into the tube and the whole of the liquid slowly drawn through with the aid of the pump into the flask. Usually one extraction of this kind is sufficient to withdraw the whole of the butter, but for the sake of greater accuracy the process may be repeated two or three times.

Titration.—The benzin may be evaporated, and the residual butter fat saponified with about 25 C.c. of the approximately semi-normal potash. The residual alkali is determined by means of the semi-normal hydrochloric acid, using phenolphthalein as indicator. The difference between the amount required in this process and the amount necessary to neutralize the quantity of alkali taken gives the amount of alkali required for the saponification. The number of Mg. of potash required for one Gm. of the fat is taken at 230. The fat may also be accurately titrated without evaporating the benzin.

Alternate Method of Estimating Water and Fat in Milk.

Method of Babcock.—In the bottom of a perforated test-tube is placed a clump of clean cotton; the tube is then filled three-quarters full of ignited asbestos, lightly packed, and a plug of cotton inserted over it. The tube and contents are weighed, and the plug of cotton carefully removed, and 5 Gm. of milk from a weighed pipette run

into it, and the plug of cotton replaced. The tube connected at its lower end by a rubber tube, and adapted with a filter-pump, is placed in a drying-oven at 100° C., and a slow current of dry air drawn through it until the water is completely expelled, which in no case requires more than two hours.

The tube containing the solids from the above operation is put in an extraction apparatus, and exhausted with ether in the usual way.

Alternate Method of Estimating Water and Fat.

Method of Professor Macfarlane.—A glass tube, 4 to 5 C.c. in length and 2 Cm. in diameter, open at one end, drawn out to a tube 5 Mm. in diameter at the other end, is two-thirds filled with asbestos fibre, such as is used in manufacturing packing. It is dried in the water-bath for several hours, cooled in the desiccator, and weighed. Ten C.c. of the milk are then added from a pipette, which is completely absorbed by the asbestos. It is then weighed, the additional weight of the milk representing the amount taken. The tube, along with many others, is placed in a water-bath with constant level, and dried for ten or twelve hours (during the night) at a temperature of 90°. Next morning, the tubes are cooled in the desiccator and weighed, the loss in weight being the moisture. The tubes are then placed in the Soxhlet extraction apparatus, and exhausted with petroleum ether for four hours. They are then removed and dried in a steam bath, cooled in desiccator, and weighed. The loss represents the butter fat.

The Estimation of Sugar.

The reagents, apparatus, and manipulation necessary to give the most reliable results in milk-sugar estimation are as follows:

Reagents.—1. Basic plumbic acetate, specific gravity 1.97: Boil a saturated solution of sugar of lead with an excess of litharge, and make it of the strength indicated above. One C.c. of this will precipitate the albumen in 50 to 60 C.c. of milk.

2. Acid Mercuric Nitrate: Dissolve mercury in double its weight of nitric acid, specific gravity 1.42. Add to the solution an equal volume of water. One C.c. of this reagent is sufficient for the quantity of milk mentioned above. Larger quantities can be used without affecting the results of polarization.

3. Mercuric Iodide with Acetic Acid: KI 33.2 Gm.; $HgCl_2$ 13.5 Gm.; HC_2H_3O 20 C.c., H_2O 64 C.c.

Apparatus.—(1) The room and milk should be kept at a constant temperature. It is not important that the temperature should be any given degree. The work can be carried on equally well at 15° C., 20° C., or 25° C. The slight variations in rotatory power within the above limits will not affect the results for analytical purposes. The temperature selected should be the one which is most easily kept constant.

(2) The specific gravity of the milk is determined. For general work this is done by a delicate specific gravity flask.

(3) If the specific gravity be 1.026, or nearly so, measure out 60.5 C.c. into the sugar flask. Add 1 C.c. of mercuric nitrate solution, or 30 C.c. mercuric iodide solution, or fill to 102 4 mark. The precipitated albumen occupies a volume of about 2.44 C.c. Hence the milk solution is really 100 C.c. If the specific gravity is 1.030, use 60 C.c. of milk. If specific gravity is 1.034, use 59.5 C.c. of milk.

(4) Fill up to mark 102.4 C.c. in flask, shake well, filter, and polarize.

Notes.—In the above method of analysis the specific rotatory power of milk-sugar is taken at 52.5, and the weight of it in 100 C.c. solution to read 100 degrees in the cane sugar scale at 20.56 Gm. This is for instruments requiring 16.19 Gm. sucrose to produce a rotation of 100 sugar degrees. It will be easy to calculate the number for milk-sugar, whatever instrument is employed.

Since the quantity of milk taken is three times 20.56 Gm., the polariscopic readings divided by three give at once the percentage of milk-sugar when a 200 Mm. tube is used.

If a 400 Mm. tube is employed, divide reading by 6; if a 500 Mm. tube is used divide by 7.5.

Since it requires but little more time, it is advisable to make the analysis in duplicate and take four readings for each tube. By following this method gross errors of observation are detected and avoided.

By using a flask graduated at 102.4 for 60 C.c. no correction for volume of precipitated casein need be made. In no case is it necessary to heat the sample before polarizing.

In the above method no account is taken of the fat which is retained on the filter with the casein. It is worth while to inquire if a correction similar to that made for the albuminoids should not also be made for the fat.

Estimation of Ash.

Evaporate to dryness in a weighed platinum dish 20 C.c. of milk from a weighing-bottle, to which 6 C.c. of HNO_3 have been added, and burn in muffle at low red heat until ash is free from carbon.

New Solvents of Prussian Blue.

GUIGNET has found that molybdic acid dissolves a large proportion of Prussian blue. Water is heated to boiling, and to this is added a mixture of Prussian blue and molybdic acid, when solution will soon take place. [The author does not give the proportions, but his statements leave it to be inferred that only a small quantity of molybdic acid is needed. At all events, it will be easy to determine the limit.] On filtering, a deep blue liquid is obtained, which is not altered by the further application of heat, and forms no precipitate with gelatin. Addition of sulphuric, nitric, or other acids, however, produces a precipitate. If this is well washed in weak alcohol, it may be redissolved in water.

Molybdate of ammonium and tungstate of ammonium are likewise good solvents of Prussian blue.

Vanadium Ink.

SINCE Berzelius' statement (1835) about the preparation of a superior black ink by adding a little vanadate of ammonium to a decoction of galls, this process has been quoted in all technological hand-books, being evidently one of those which had not been practically tested. Carl Appelbaum recently reported that there is a mistake about this process, nothing in the shape of ink being thereby obtainable.

But an ink which may be useful in certain cases can be prepared as follows:

Dissolve 10 parts of tannic acid in 100 parts of water, and 0.4 part of vanadate of ammonium in 10 parts of water. Mix the two solutions, and shake moderately.

This ink flows with a deep-black color from the pen, without spreading or striking through the paper, although it contains no gum. It has a pleasant gloss, cannot be copied, dries quickly, and, even if the writing is laid in water for 24 hours, does not change its black color. It is very useful for writing addresses of letters, postal cards, etc., when used fresh. Dilute acids do not alter it, but solutions of chlorinated potassa (or soda) bleach it completely. After a few weeks the tint of the ink begins to change, writing executed with it becomes lighter and somewhat yellowish, and in about three months the change is completed, when it has a foxy yellow tint. The writing is still plainly legible, however, and cannot be removed either by water or by acids.—*Dingl. Polyt. J.*, 271, 423.

On the Separation of Strychnine from Brucine.

J. E. GEROCK has discovered a new and apparently very satisfactory method for separating strychnine from brucine. On studying the effect of nitric acid of varying strength upon the two alkaloids, he found that strychnine was far more resistant towards it than brucine. Upon the basis of a long series of experiments, it was ascertained that nitric acid of sp. gr. 1.056, although it assumes a yellow color when it is brought in contact with strychnine, yet does not alter the alkaloid chemically, while the same acid will, with the aid of heat, form with the brucine a yellow solution, which no longer contains the alkaloid.

The author also found that the picrates of both alkaloids behave towards nitric acid exactly like the free bases.

The following method was gradually devised for determining both alkaloids when present in mixture:

Gently heat the solution of the two alkaloids, which should be as neutral as possible, upon a steam-bath, and precipitate by picric acid. Picrate of brucine separates only very slowly in the cold. Under the influence of heat it becomes more flaky, and less prone to stop the pores of the filter. After a while collect the picrates upon a tared filter, wash with cold water until this runs off colorless, dry at 105° C., and weigh. Now transfer the precipitate as completely as possible from the filter into a beaker, pour nitric acid (sp. gr. 1.056) into the filter to destroy any adhering picrate of brucine, and at the same time to wash anything soluble into the beaker. The acid should have previously been warmed upon the steam-bath, and it should be used in several successive portions. The contents of the beaker are now digested upon the steam-bath for some time [the author does not state how long or at what temperature], then the liquid exactly neutralized, and mixed with a trace of acetic acid (picrate of strychnine is soluble in nitric acid as well as in alkalies, but insoluble in acetic acid if highly diluted). After it has become completely cold, the residuary picrate of strychnine is transferred to the filter already used [which should be previously washed with cold water], washed, dried, and weighed. The difference of the two weighings gives the brucine.

The author quotes the following table of results to show the reliability of the method:

		I.	II.	III.	IV.
Strychnine,	weighed	0.084	0.0905	0.1310	0.065
"	calculated	0.081	0.0878	0.1340	0.063
Brucine,	weighed	0.031	0.1435	0.0845	0.046
"	calculated	0.033	0.1510	0.0850	0.048

The brucine was always used and weighed in its anhydrous condition.—After *Arch. d. Pharm.*, 1889, 158.

Testing the Purity of Reagents.

(Continued from page 73 *)

18. *Barii Carbonas purissimus.*

Test for calcium and strontium: Dissolve 5 Gm. in diluted hydrochloric acid, evaporate to dryness, extract with absolute alcohol, and evaporate the alcoholic solution. Not more than traces of a residue should remain, and when this is moistened with alcohol, and ignited, the flame should not show a red tint.

Test for alkalies: Dissolve 5 Gm. of the salt in diluted hydrochloric acid, which must result in a clear solution. Dilute this to 150 C.c., heat to boiling, precipitate completely with sulphuric acid, filter after twelve hours, and evaporate the filtrate to dryness in a platinum capsule. Not more than traces of a residue should remain.

Test for metals: A solution of the salt in dilute hydrochloric acid (1 : 20) is not affected by hydrosulphuric acid, or by ammonia and sulphide of ammonium.

Test for other barium salts: On adding to a solution (1 in 20) of the salt in diluted nitric acid some nitrate of silver, not more than a faint opalescence should occur. On dissolving 1 Gm. of the salt in dilute acetic acid, adding 1 drop of indigo solution and a few C.c. of concentrated sulphuric acid, the color should not be discharged.

19. *Barii Chloridum purissimum.*

Test for alkalies: Dissolve 5 Gm. of the salt in 150 C.c. of water, heat to boiling, precipitate the barium with sulphuric acid, filter after twelve hours, and evaporate the filtrate to dryness in a platinum capsule. Not more than traces of residue should remain.

Note.—If the residue is to be determined quantitatively, a larger amount of the salt is to be used, and at the same time a determination of the residue left by the water and acid (without barium) is made. The author states that 20 Gm. of the salt were found to yield 0.04 Gm. of residue, which gave a strong reaction for potassium.

Since the ordinary course of analysis often requires that alkalies must be looked for in the filtrate obtained after determining sulphuric acid, it is necessary to use a chloride of barium which is entirely free from alkali. The author states that he is at present engaged in producing such a salt.

Test for metals: The solution (1 : 20), when treated with ammonia and sulphide of ammonium, undergoes no alteration, nor is the solution (1 : 20), slightly acidulated with hydrochloric acid, affected by hydrosulphuric acid.

Note.—Commercial chloride of barium frequently contains heavy metals (lead).

Test for chlorate of potassium: The author, having met with this contamination, directs the following method of testing: Triturate 2 Gm., mix them in a test tube with 10 C.c. of strong hydrochloric acid, and warm gently. Neither the crystals or powder, nor the solution should acquire a yellow tint.

20. *Barii Hydroxicum cryst. purissimum.*

"Pure white crystals which are soluble in water, leaving but little carbonate of barium behind."

Note.—Sometimes yellowish crystals are sold as "puriss."

Test for chlorides : A solution (1:30) of the oxide in dilute nitric acid is not affected by nitrate of silver.

21. *Bismuthi Oxidum Hydratum purissimum.*

Test for arsenic: Boil 1 Gm. of the salt with 10 Gm. of sulphuric acid, until the nitric acid has been completely expelled. Then test the liquid in Marsh's apparatus. After half an hour's slow passage of gas no arsenical mirror should appear.

Test for lead : Shake ½ Gm. of the salt with a few drops of nitric and 25 C.c. of dilute sulphuric acid. A clear solution must result.

22. *Calcii Chloridum crystallisatum.*

Test for foreign metals and sulphuric acid: The aqueous solution (1:5) is neutral, and is not affected either by sulphide of ammonium, or by addition of hydrochloric acid and sulphuretted hydrogen water. On adding to the solution (1:20) some chloride of barium and a few drops of hydrochloric acid, no change should become visible within several hours.

The salt should be completely soluble in 10 parts of absolute alcohol.

On boiling 2 Gm. with solution of soda, no vapor of ammonia (recognizable by moistened curcuma paper) should be given off. On adding lime water to the aqueous solution (1:50), no change should be produced even on longer standing, and addition of ammonia should produce no turbidity (absence of barium).

23. *Calcii Sulphas purus præcipitatus.*

On gently heating 2 Gm. with 10 C.c. of hydrochloric acid and 100 C.c. of water, a clear solution should result, which is not altered by adding ammonia and sulphide of ammonium, and heating. On precipitating this solution with oxalate of ammonium and filtering, the filtrate, on being evaporated and ignited in a platinum capsule, leaves not more than very minute traces of residue.

24. *Cupri Oxidum purum ponderosum.*

Dense, heavy, deep-black, finely granular powder.

On heating 100 Gm. and passing air over it, no acid vapors should be given off. If 2 Gm. are dissolved in hydrochloric acid, and the solution diluted to 100 C.c., it should be almost clear. After precipitating with hydrosulphuric acid, the filtrate should leave not more than a slight residue (a little iron). A solution (1 in 50) of the oxide in hydrochloric acid should not be rendered turbid by chloride of barium or sulphuric acid. On heating 20 Gm. with 50 C.c. of water upon a water-bath, pouring off the water, and evaporating, no weighable residue should remain.

25. *Cupri Sulphas purissimus crystallisatus.*

On dissolving 2 Gm. of the salt in 20 C.c. of water, precipitating with hydrosulphuric acid, filtering, evaporating the filtrate and igniting, not more than traces of residue should remain.

Note.—From 20 Gm. of the salt, the author obtained 0.014 Gm., that is, about 0.07% of residue.

26. *Diphenylaminum purum.*

A solution of 0.1 Gm. in 20 C.c. of pure concentrated sulphuric acid should yield a colorless or only very faintly yellowish solution. The melting point of the crystals is 54°C.

27. *Ferri Sulphidum.*

Sulphide of iron always contains traces of arsenic. Hence various methods have been proposed for obtaining hydrosulphuric acid gas absolutely free from arsenic. Thus the following have been recommended as sources of the gas, in place of sulphide of iron: Sulphide of barium, sulphide of calcium; solutions of barium, calcium, or magnesium sulphydrate; artificially prepared pure sulphide of iron, sulphide of zinc in pencils, etc., etc.

According to Von der Pfordten, all arsenic may be removed from the gas eliminated out of the ordinary sulphide of iron by passing the gas over heated sulphide of potassium.

28. *Ferri Sulphas purissimus.*

If an aqueous solution (1 in 25) of the salt is heated to boiling, oxidized with nitric acid, under addition of a little hydrochloric acid, then mixed with an excess of ammonia to precipitate the iron, the filtrate should give no reaction for zinc when tested with sulphide of ammonium, nor should another portion of it, when supersaturated with acetic acid and tested with ferrocyanide of potassium, yield a brownish-red precipitate (presence of copper.)

29. *Hydrargyri Chloridum Corrosivum purissimum.*

Aside from the usual tests of purity, given by the pharmacopœia, the complete solubility of the salt should be ascertained. Lenz has pointed out that the commercial sublimate, when dissolved, often leaves behind a considerable insoluble residue.

30. *Hydroxylaminæ Hydrochloras* (Hydroxylamine Muriate. NOH_3HCl).

This salt, which is in clear, colorless crystals, should form a clear solution with absolute alcohol. The alcoholic solution, when treated with platinic chloride, yields no precipitate (difference from and absence of ammonium salts).

Note. The author states that he often found chloride of ammonium in the commercial salt.

31. *Iodum resublimatum purissimum.*

On heating 2 Gm., no residue should remain. In other respects the author refers to pharmacopœial tests.

When iodine is to be re-sublimed for analytical purposes, this is best done by mixing it with iodide of potassium, then cautiously subliming, and immediately filling the product into small vials, which must be well closed.

32. *Potassii Chloras purissimus.*

Aside from pharmacopœial tests, the author points out that lead has once been found in the salt by Hilger, and arsenic by R. Otto. Therefore, if the salt is to be used for destroying organic matter in toxicological investigations, the absence of these contaminations must be insured.

33. *Potassa.*

Three sorts of caustic potassa are used in analytical laboratories:

a. *The purest*, called "Potassa purissima" (on imported bottles labelled: "Kalium hydricum purissimum," or "Kali hydricum e Kalio sulphurico et Baryta hydrica paratum").

b. *Second quality:* "Potassa pura" (on imported bottles: "Kalium hydricum purum," or "Kali hydricum alcohole depuratum").

c. *Third quality:* "Potassa depurata" (on imported bottles: "Kalium hydricum depuratum").

The author has given the characteristics of each of these sorts in great detail. As there exists much confusion regarding the relative degree of purity claimed for or possessed by these products, we quote the author's text in full.

33, a. *Potassa Purissima.* White, crystalline pieces.

Solubility and absence of alumina: 10 Gm. should give a clear and colorless solution with 20 C.c. of water. On super-

* Abstract from Krauch, Dr. C., "Die Prüfung der chemischen Reagentien auf Reinheit." 8vo. Darmstadt, 1888.

saturating this solution with acetic acid, adding a slight excess of ammonia, diluting to 100 C.c., heating half an hour in a beaker on a water-bath until only a faint odor of ammonia is perceptible, and setting aside for several hours at the ordinary temperature, no flocculi or precipitate should make their appearance. Should the application of heat have completely expelled all free ammonia, a few drops of this should be added, before the liquid is set aside.

The author has found in what professed to be this quality of potassa, not only alumina, but also sulphuric acid and baryta.

On adding to portions of the faintly alkaline solution, obtained as above, oxalate of ammonium and sulphide of ammonium, no change should occur (abs. of calcium and heavy metals).

If 5 Gm. are dissolved in dilute hydrochloric acid, the solution evaporated, the residue dried for half an hour at 100° C. and dissolved in 250 C.c. of water, with a little hydrochloric acid, the resulting solution should be clear (abs. of silica).

An aqueous solution (1:20) acidulated with nitric acid is at most rendered only faintly opalescent by nitrate of silver (limit of chloride).

On dissolving 2 Gm. in 10 C.c. of water, supersaturating with dilute sulphuric acid, adding a drop of indigo solution diluted with twice its volume of water, and afterwards 10 C.c. of concentrated sulphuric acid, the blue tint should remain unchanged even on prolonged standing (abs. of nitric acid).

Another method to detect nitric acid is as follows: Dissolve 50 Gm. of the potassa in 200 C.c. of water in a flask of the capacity of about 500 C.c., and add 500 Gm. of powdered zinc free from arsenic, and some reduced iron. Connect the flask with a receiver containing about 10 C.c. of very dilute sulphuric acid (from 1 part of sulphuric acid diluted with 100 parts of water), allow to stand a few hours, and then distil with a small flame, so as to obtain about 15 C.c. of distillate in 45 minutes. Now render the liquid in the receiver slightly alkaline with purest potassa [previously ascertained to be free from nitric acid], and then add about 2 C.c. of Nessler's reagent, which must not produce more than a yellow tint or faint cloudiness, but no decided brownish-red precipitate, such as would render the liquid opaque when viewed in a layer of about 5 centimeters in depth.

Note.—The remarks made under Acidum Sulph. purissimum (see April number, page 72) on tests for nitric acid, apply here also. Only it should be noted that the indigo test is not as satisfactory in the case of caustic alkalies. For this reason, the author has devised another method, in which any nitric acid present is converted into ammonia. When executed as described above, it will easily detect as little as 1 Mg. (and even less) of absolute nitric acid in 25 Gm. of caustic potassa or soda. Samples prepared by the author on purpose from 25 Gm. of the pure alkali and 1 Mg. of nitric acid, yielded a fluid which developed immediately a strong brownish-red cloudiness and precipitate, rendering the liquid opaque. A yellow tint or faint cloudiness, on the other hand, must be permitted, since this is often obtained even in a blank experiment (without alkali) on merely boiling water with zinc and iron. Indeed, it is always advisable to make a blank test besides the real one upon the substance itself. [This advice of the author is quite appropriate. It should be applied also to the indigo test for nitric acid. Indeed, analysts usually make duplicate tests, one upon water known to be pure, and the other upon the particular water to be examined.]

Commercial caustic alkalies are often contaminated with more or less of nitrite or nitrate (up to several per cent). If the amount of acid is to be determined quantitatively, the same reduction method as above described is used, but alcohol is used in the flask, and a known quantity of volumetric sulphuric acid is put in the receiver. After the distillation is finished, the amount of unsaturated acid is ascertained by titration.

On dissolving 5 Gm. of the potassa in 25 Gm. of 90% alcohol, a clear and colorless solution should result (abs. of carbonic acid). This test would also reveal the presence of other impurities, such as chlorides, and coloring matters due to bad management in the manufacture.

If 5 Gm. are dissolved in water, the solution strongly supersaturated with nitric acid, and a nitric acid solution of molybdate of ammonium added, no precipitate should appear, after setting the mixture aside for two hours in a warm place (abs. of phosphoric acid).

33 b. *Potassa pura. Potassa Alcohole depurata.*

White, crystalline lumps or sticks.

10 Gm. should give a clear, colorless solution with 40 C.c. of water. On diluting this to 100 C.c., supersaturating with acetic acid, and adding an excess of ammonia, no flocculi of alumina should separate within 5 minutes, nor should oxalate or sulphide of ammonium cause any turbidity. Only after standing some time may a precipitate of alumina appear.

Nitric and Sulphuric Acids, as well as Chlorides, must be absent. Test the same as under No. 33 a.

On dissolving 5 Gm. in dilute hydrochloric acid, evaporating, drying the residue at 100° C., and re-dissolving in 150 C.c. of water, the resulting solution should not be more than slightly turbid (limit of silica).

If 2 Gm. of this potassa are dissolved in 10 C.c. of water, and the solution poured into a mixture of 8 C.c. of hydrochloric acid (sp. gr. 1.120) and 8 C.c. of water, no effervescence should occur (abs. of carbonate).

33 c. *Potassa depurata.*

White, crystalline lumps or sticks.

The aqueous solution should be clear and colorless.

Test for nitric acid: If 2 Gm. are dissolved in 10 C.c. of water, the solution supersaturated with sulphuric acid, then 1 drop of indigo solution diluted with twice its volume of water, and afterwards 10 C.c. of concentrated sulphuric acid added, the bluish color should not be discharged.

Absence of carbonate is determined as under 33 b.

Note.—This quality of potassa contains usually about 1% of chloride, also a little silicic acid and alumina. A solution of 5 Gm. in 100 C.c. of water, when supersaturated with hydrochloric acid, and afterwards with ammonia, at once separates flocculi of alumina.

(To be continued.)

Improved Method of Assaying Mercuric Chloride in Antiseptic Dressings.

PROF. BECKURTS publishes (in *Pharm. Centralhalle*) an improved method for determining the quantity of mercuric chloride in antiseptic dressings, based upon a process formerly recommended by him, but which was subsequently found not to be applicable in all cases, owing to the presence, in some dressings, of certain interfering substances. The new process is as follows:

Put 20 Gm. of the sublimated gauze (cut into strips) or of the sublimated cotton into a 1,000 C.c. flask, together with 0.5 Gm. of sodium chloride and 250 C.c. of warm water. Carefully drive out all air-bubbles, allow to cool, and then add enough distilled water to make 1 liter. Shake the mixture thoroughly [which is evidently intended to be done so that as little air can mix with the liquid as possible], and filter off 500 C.c., or more exactly 493 C.c., if the spec. grav. of the cotton fabric is taken into consideration, being assumed to be 1.400, and therefore displacing water in the proportion of 10 to 7. Mix the filtrate in a flask with 0.2 Gm. of ferrous sulphate, then with solution of soda to alkaline reaction, and lastly with diluted sulphuric acid to faintly acid reaction. Now add to the mixture, which has been rendered turbid by the separation of calomel, enough of a $\frac{1}{100}$ volumetric solution of iodine to make it contain a small excess of iodine. Immediately add a little gelatinized starch, and determine the excess of iodine by retitration with $\frac{1}{100}$ volumetric hyposulphite up to the point of discoloration. By multiplying the added cubic centimeters of the $\frac{1}{100}$ iodine solution, *less* the number of C.c. of hyposulphite, with 0.00271, a product will be obtained which represents the amount of mercuric chloride in 10 Gm. of the dressing.

The author's analytical proofs of the reliability of this method are very satisfactory.—After *Pharm. Centralh.*, No. 12.

The Preparation of Salicylate of Mercury.

THE following method for preparing salicylate of mercury (mercuric) has been devised by Dr. E. Pieszczek, of Königsberg:

Dissolve 27 parts of corrosive sublimate in 540 parts of lukewarm water, allow to cool to about 15° C., filter the solution, and add the filtrate, slowly and under stirring, to a cold mixture of 81 parts of solution of soda (sp. gr. 1.160), and 200 parts of water [or, simply, a solution of 12 parts of pure caustic soda in 268 parts of water]. After the oxide has deposited, it is washed with *cold* water, first by decantation, and afterwards upon a filter, until the washings cease to give a reaction of chlorine. It is then, while still pulpy, transferred to a flask, and agitated with enough water to make a thin fluid mixture, to which 15 parts of salicylic acid are then added. The whole is well mixed, and the flask heated upon a boiling water-bath. After a very short time the contents of the flask, if constantly kept in motion by rotation, will acquire a white tint, owing to the change of the yellow oxide of mercury to white salicylate. It is important to keep the mixture in constant motion, so that no particles of mercuric oxide may be imbedded in lumps of salicylate.

When the salicylate has been completely formed, it is transferred to a filter and washed with warm water to remove the excess of salicylic acid. Washing is interrupted when the water ceases to have an acid reaction.

When dried at a moderate heat the compound appears as a white, amorphous powder, which when diffused through water containing a few drops of soda solution [the author does not give any relative proportions between the quantity of the salt and soda] forms a perfectly clear solution. Hydrochloric acid produces in the latter a gelatinous precipitate.

The author obtained from the salt, on analysis, 59.16 per cent of mercury. This shows the salt to have a basic character, and to have the composition $HgC_7H_4O_3$.

Density: Specific Gravity.

THE following is a portion of a paper read by H. Droop Richmond at a recent meeting of the Society of Public Analysts on "Density" [we have extended the title], and published in *The Analyst* (April, 1889):

When we talk of the density of a body, we mean the mass of a unit of volume of that body, or, as the unit of mass has been fixed at 1 Gm. and the unit of volume at 1 cubic centimeter, the number of Gm. in 1 cubic centimeter; thence it follows that density is not a relative but an absolute property. Notwithstanding that the cubic centimeter has been fixed as the volume of 1 Gm. of water at 4° C. (the point of maximum density), a custom has sprung up of assuming that an instrument for taking density graduated to hold x Gm. of water at 15° C., 15.5°, or 16° C. (as the case may be), holds x cubic centimeters; this arbitrary creation of units of volume, besides being clearly wrong, is liable to create confusion, and renders the expression of results uncertain, which uncertainty is not removed entirely by the use of such an illogical expression as "the density at 15° compared with water at the same temperature." To compare an absolute quantity is absurd; this uncertainty is much less, however, than that caused by errors of observation, many of which are not even noticed, much less corrected.

I do not propose to discuss the taking of densities of either gases or solids, on account of the special methods and precautions against errors, which are so well known in the case of gases, and of the comparative unimportance attaching to the determination of the densities of solids; my remarks must therefore be taken as applying to liquids only.

We use practically three methods for determining the densities of liquids: 1. By hydrometers. 2. By the measurement of the loss of weight of a solid in a liquid—*e. g.*, the Westphal balance and the torsion balance. 3. By the determination of the mass of known volume—*e. g.*, the pyknometer.

1. *Hydrometers.*—The faults of these instruments consist in errors introduced by the cohesion of the liquid to the material of which the instrument is made, which renders it difficult to read off the exact point which is at the level of the surface of the liquid; as also the volume of the portion immersed is determined in part by the cohesion, it follows that hydrometers do not give the same reading in different liquids, whose density may be the same, if the viscosity is different. Another error is caused by expansion by heat, if the hydrometer is used at a different temperature than that for which it was graduated. Their merit consists in speed, and if they are graduated for use in one particular liquid and at a pretty constant temperature, fairly exact results are obtainable (within 0.0005).

2. *Instruments which measure loss of weight in a liquid.*—Of these the Westphal balance is the most important and widely used, and is extremely quick and convenient, where great accuracy is not required, though open to grave errors. Its faults are the errors due to cohesion (very slight); to the difference between true weight and apparent weight in air; to the condensed film of air on the plummet, which is, however, removed on immersion in most liquids; to the unequal expansion of plummet and liquid of which the density is to be taken at any other temperature than that for which the instrument is set, and of the arms of the balance; to the wire or thread used to suspend the plummet (usually reduced to a minimum by the use of a very fine thread); and to the imperfections in the balance (often large in those commonly in use). Many of these errors may be neglected in ordinary work; for instance, those due to cohesion, unless the fluid is very viscous; to difference between true weight and apparent weight in air, if the substance has a density near 1; to the condensed film of air; to the use of a wire or thread; and to the expansion of the arms. It is in the construction that the Westphal balance chiefly errs, one error having been pointed out by Allen (*Analyst*, 1889, p. 11) in the length of the intervals between the divisions. The beam of the Westphal balance is usually made 10 centimeters in length, so that to insure absolute accuracy the intervals should be 1 centimeter apart, within $\frac{1}{10}$ of a millimeter, an amount of accuracy which it is not easy to attain in practice, and which may easily be diminished by wear. Another error is introduced in the hook riding on a knife edge, from which the plummet hangs; if the position of this is changed, as it must necessarily often be, a difference in the reading may be observed, amounting sometimes to .001. Another error may occur from one of the riders not sitting absolutely exactly in its place, but inclined to one end of the beam or the other; this error may amount to as much as .0005. The error introduced by the expansion of the plummet is, of course, obvious, and should be allowed for by noticing the difference between the actual density of water at various temperatures and the indicated density. Unless this is done, determinations made at higher temperatures are only relative, and cannot even be compared with those obtained by another instrument, unless the coefficient of expansion of the material of which the two plummets are made is the same. An inconvenience is felt if the density of a liquid is to be taken at a temperature differing from the temperature at which it is, a comparatively large bulk of liquid having to be warmed or cooled, as the case may be. I should fix the limit of accuracy of the Westphal balance at not much less than .0005, although closer duplicate readings are often obtained.

The torsion balance is open to all the faults of the Westphal balance, except those due to construction, and, besides, has the tendency to acquire a slight permanent set, and is not to be recommended except for rough density determinations.

3. *Instruments in which the mass of known value is taken, or pyknometers.*—These are practically two in number, the specific-gravity bottle and the Sprengel tube and its modifications, neither of which presents any real advantage over the other. It is perhaps rather easier to adjust the temperature of the liquid in the Sprengel tube, but, on the other hand, the Sprengel tube is more liable to lose weight than the bottle, when in constant use. The errors, all of which can be readily allowed for, are the following: those introduced by the condensed film of air, both inside and outside; by the difference between true weight and apparent weight in air; and by the expansion of the glass or other material of which the instrument is made. The most difficult to allow for is the condensed film of air, which I consequently try to eliminate as far as possible by the following plan: dry the bottle or tube by heating it and passing a current of dry air through it (of course, removing the thermometer if the temperature is higher than the highest it will bear), cool by pouring a current of cold water on the outside, wipe dry, and weigh at once; duplicate weighings very rarely differ by as much as .0005 Gm. I then fill with distilled water freshly boiled in a platinum vessel, adjust the temperature accurately to 4° C., wipe dry, and weigh at once. The increase of weight in Gm., corrected for the volume of displaced air, will give the number of cubic centimeters the bottle or tube will hold. The difference between duplicate weighings should not exceed .0005 Gm.; the difference between the capacity at 4° and the weight (corrected) of water in Gm. held by the bottle or tube held at any other temperature, divided by the density of water at that temperature, will give the increase of capacity due to expansion of the glass or other material of which the bottle or tube is made. A table of capacities at various temperatures, and a formula for the expansion, may easily be made of it for each instrument.

TABLE OF DENSITIES OF WATER.

(Compiled from the results of Pierre, Despretz, and Kopp.)

Temp. C.	Density.	Temp. C.	Density.
0°	.99988	40°	.99237
4°	1.00000	50°	.98817
10°	.99975	60°	.98343
15.5° (60° F.)	.99910	70°	.97794
20°	.99826	80°	.97193
30°	.99575	90°	.96561
37.8° (100° F.)	.99313	100°	.95865

The determination of densities at higher temperatures than 15.5° is usually only required for bodies that are solid at that temperature, such as butter and other fats; Muter proposed to do this at 100° F. (37.8° C.), and graduated his instruments with water at the same temperature, and gave to these determinations the name of "actual density," an unfortunate name, as they were really the actual densities divided by the density of water at that temperature. These, however, were good determinations, as there could be no mistake as to what they really were. Three years ago Estcourt proposed to take the density of fats at 100° C. by the Westphal balance, a plan which has become rather general among English analysts, but is a distinct falling off from Muter's method, because the expansion, which is not usually allowed for, is enormously increased at that temperature; and, moreover, the temperature is exceedingly difficult to obtain, as the boiling point of water depends on the pressure of the air. I do not consider that the results obtained by two analysts taking their densities thus are comparable within 0.002; the only advantage which this method has over the other is, that beeswax and carnauba-wax are liquid at 100° C. while solid at 100° F. In the regulations for analysis for the State of Colorado, it is laid down that the densities of fats shall be taken at 40° C., which seems to me the most convenient temperature, now that the centigrade scale is in general use, and I think that we may expect, if the precautions I have drawn attention to are taken, that two analysts should not differ by more than 0.0002 or 0.0003.

There are two minor precautions I should wish to draw the attention of analysts to: first, to allow a sufficient time (when using the bottle or tube) for the liquid to contract to its full amount; alcohol contracts very quickly, glycerin very much more slowly, while, as an extreme case, Perkin has recorded a mixture of aldehyde and water $C_2H_4O+H_2O$ which took several hours (*J. Chem. Soc.*, 1887, p. 817); the other precaution is to use an accurate thermometer, the great majority of low-priced thermometers being sensibly wrong.

In conclusion, I would recommend that all densities should be the weight (mass) of the substance in the cubic centimeter, that the density of liquids should be taken at 15° C., and of fats at 40°. A symbol, such as $D_{15°}$, meaning density at 15°, and $D_{40°}$, at 40°, might be advantageously adopted.

The Pharmacopœial Tests of Iodide of Potassium.

THE Pharmacopœia Committee of the German Pharmaceutical Association proposes several modifications in the officinal characterization of this salt, which will render the tests, on the one hand, more rigorous and exact, and, on the other hand, within the limits of the manufacturer's possibilities. We first give the proposed pharmacopœial text, in which the alterations of the text of Pharm. Germ. II. are inclosed in quotation marks, and afterwards the commentary.

Kalium Jodatum.

White, cubical crystals, not absorbing moisture when exposed to air, having a sharply saline and afterwards bitter taste, soluble in 0.75 parts of water and in 12 parts of alcohol. The aqueous solution, mixed with a little chlorine water, and shaken with chloroform, colors the latter violet. When mixed with tartaric acid, it yields, upon standing for a short time, a white, crystalline precipitate.

When heated in a loop of platinum wire, the salt should impart to the flame a tint which is violet from the beginning. When laid upon moistened red litmus paper, it should not at once color the latter violet-blue.

"A freshly prepared solution of the salt with 20 parts of previously boiled water, when mixed with solution of starch and diluted sulphuric acid, should not at once assume a blue color." If a brisk evolution of gas is produced by means of zinc and "diluted" hydrochloric acid [contained in a flask], and a solution of the salt mixed with gelatinized starch is added, it should not acquire a blue tint; "and the generated gas shall not impart a brown or black color to paper moistened with solution of acetate of lead."

The aqueous solution of the salt (1 in 20) should "not at once" be altered. When treated with a granule of ferrous sulphate, a drop of solution of ferric chloride, and some solution of soda, with gentle heating, the solution should not acquire a blue color on being supersaturated with hydrochloric acid.

Solution of hydrosulphuric acid should not alter the aqueous solution (1 in 20) [of the salt].

On dissolving 0.2 Gm. of iodide of potassium in 2 C.c. of water of ammonia, and precipitating, under agitation, with 13 C.c. of one-tenth normal solution of nitrate of silver, the filtrate, when supersaturated with nitric acid, should not be rendered completely non-transparent within ten minutes, "nor should it acquire a dark color."

To be *carefully* preserved.

Commentary.—The methods of applying the test have been modified in several directions. On the other hand, it appeared to be superfluous, in the ignition test, to direct that the salt should be used in a *powdered* condition, since this is the usual way. It was also deemed unnecessary to state that, for all tests, several crystals of different sizes should be reduced, together, to a coarse powder. For the same reason, it was omitted to direct "broken crystals" of the salt in the test with moistened litmus paper, since the salt may also be used in a powdered condition. To test the salt for the presence of carbonates by means of phenolphthalein was not deemed advisable, as the test is too rigorous.

In the test for iodate several precautions have to be observed. According to the investigations of Mühe and Beckurts (1887), the carbonic acid contained in water which has been exposed to air, exercises a decomposing action upon the solutions of alkali iodides, setting iodine free. Hence a solution of iodide of potassium prepared with water containing air and carbonic acid, when mixed with gelatinized starch and dilute sulphuric acid, usually turns bluish after a short time without the tint being due to iodic acid. But if the solution is prepared with previously boiled water, and if the starch and acid are then immediately added, no blue tint is produced, if the salt was pure. The tint is developed gradually, by exposing the mixture to air, in consequence of the absorption of oxygen from the latter. It is, of course, of importance to test the solution immediately after having been made with air-free water, otherwise the advantage gained by the use of the latter would be lost.

It is unadvisable to combine the test for iodate with the subsequent one for nitrate, since the evolution of gas would generally be too feeble. It is much preferable to generate hydrogen, in a separate test-tube, by means of a piece of zinc and dilute sulphuric acid, and then to add the solution of the salt mixed with gelatinized starch, or else the previously prepared acid solution (provided the blue color failed to appear). It is particularly to be observed that *diluted* hydrochloric acid (Ph. Germ. II., sp. gr. 1061) be used, since the strong acid produces a blue color, even in the case of the purest iodide of potassium.

The hydrogen gas developed by the last-named reaction is to be tested by means of acetate of lead paper. If this acquires, after a short time, a brownish to black tint, this shows the presence of hydrosulphuric acid, caused by the contamination of the iodide with some sulphite or hyposulphite. These impurities which are [sometimes] added to cover the presence of iodate, will betray their presence by the above test, even if only very minute in quantity. Hyposulphites are also discovered by the last test given in the above description of the salt, namely, that with nitrate of silver (for presence of chlorine). The final filtrate, separated from the chloride of silver, when acidulated, will become black—if a hyposulphite had been present—due to the separation of sulphide of silver. Sulphites, however, are not detected by this test.

Pharm. Germ. II. directs the salt to be tested for sulphate by mixing 20 C.c. of the solution (1 in 20) with 10 drops of solution of nitrate of barium, whereby no turbidity should be produced within five minutes. Almost the same object is attained by directing that turbidity should not be produced "at once." The latter direction saves time, and does not introduce rigid conditions of time, exact measures, etc.

NOTE BY ED. AM. DRUGG.—As we are perfectly familiar with the language and phraseology of the German Pharmacopœia, we can scarcely be accused of speaking from misunderstanding when we assert that the construction and wording of the *text* of this work leave much to be desired. We refer to the uniformity of treatment and to the syntax. There is evidently a desire to construct the text in a flowing, sometimes almost rhetoric style, with an evident effort to avoid monotonous similarity in the construction of passages. There is no fixed uniformity in the method of enumerating the physical properties of substances, such as color, shape, solubility, etc., and also in other matters, the arrangement being sometimes altered, apparently only for the purpose of rendering the sentences smoother. This is not the proper place to expatiate on this subject. But in our opinion it would be very desirable if the very excellent contents of the text of this Pharmacopœia, both present and prospective, were clothed in language free from any ambiguity, and chosen with a view to uniform treatment, irrespective of beauty or smoothness of diction, or pleasant cadences of sentences. We do not look for this in a law book, such as a pharmacopœia. If we can have it, *in addition* to logical and uniform treatment of each subject, we will thankfully accept it. But rather sacrifice the style than the uniformity and thorough perspicuity.

The Assay of Ipecac.

MESSRS. R. A. CRIPPS and A. WHITBY have made a study of the methods so far proposed for assaying the emetine in ipecac, and they have arrived at the following results:

1. That of the methods yet proposed, the process of Lyons with ammoniated ether is to be recommended as most fully exhausting the drug, at the same time being rapid in execution. We, however, prefer to conduct the extraction by cold percolation, thereby avoiding so many weighings, the exhaustion being fully as complete.

2. That the ammoniated chloroform of Flückiger is decidedly objectionable.

3. The use of acetic ether alone, acetic ether with one per cent of glacial acetic acid, or acetic ether, chloroform and glacial acetic acid, is attended with good results; the extraction is, perhaps, rather more rapid than by Lyons' solvent, and the process works well. It is carried out thus:

Improved Process.—2.5 grammes of ipecacuanha root, in fine powder, are introduced into a small glass cylindrical percolator, about 200 Mm. long, and 11 to 12 Mm. internal diameter, very lightly shaken down, and a loose plug of cotton-wool placed on the surface of the powders; 10 C.c. of the solvent are now poured on and allowed to soak through the powder, care being taken to observe if any air spaces or channels exist in any portion. When the fluid begins to drop from the percolator, the *upper* open end is securely corked to prevent any further flow of the liquid, and the whole allowed to macerate for about two hours, or preferably over night. Percolation is then proceeded with until about 50 C.c. of percolate are obtained, or the root is exhausted; this is the case if six to ten drops of the liquid, when evaporated, and the residue, dissolved in dilute sulphuric acid, give no precipitate with Mayer's solution.

The solution thus obtained is introduced into a separator, and washed with *four* successive quantities of slightly acidulated water (about 8 C.c. at a time). The aqueous liquid now containing the emetine is washed once more with ether while still acid, then rendered alkaline with ammonia, and washed *three* times with 6 C.c. of chloroform. The mixed ethereal and chloroformic solutions are washed once with water, then evaporated in a current of air, and dried by exposure over sulphuric acid for some hours. The residue is then weighed, dissolved in 20 C.c. of water acidulated with six drops of 5% (by volume) sulphuric acid, in which it should be almost entirely soluble, and titrated with Mayer's solution (half strength) in the usual manner; 1 C.c. = 0.00945 Gm. emetine.

This is the method we recommend when strictly accurate results are required, but for general use it is frequently of importance to save time, even at a slight loss of accu-

racy. This saving of time may be effected either by drying the final residue on a water-bath for one hour only, when the amount of alkaloid found by titration will be slightly below the correct percentage, or by dissolving the emetine obtained, without previous drying, in dilute acid, and titrating; or, finally, by shaking out the alkaloids from the original acetic ether solution by acid water, using, however, four washings of only 5 C.c. each (to make the final bulk only 20 C.c.) with six drops of 5% sulphuric acid in the whole, warming the solution gently to remove dissolved acetic ether, and titrating with Mayer's solution. These alternatives have the disadvantage of not allowing *two* results in the same estimation, which serve as a check upon each other.

The experiments recorded above were all performed upon the same sample of root; since these were completed, further experience of the use of acetic ether by cold percolation has served to increase our confidence in that solvent, the results being always *very* close to those by Lyons' method; it is of great importance that the dimensions of the percolator should be such as described, if the same quantity of powder be operated upon.

Since the adoption of the acetic ether as a solvent, the *average* percentage of emetine found in ipecacuanha has been considerably higher than when we employed ammoniated chloroform, as shown by the following record from the laboratory journals:

By ammoniated chloroform impure alkaloid weighed 1.60, 1.57, 1.85, 1.52, 1.52, 2.05, 1.82, 1.94, 2.65, 2.56, 2.90, 2.09; average of 12 samples, 2.00 per cent.

By alkaloid by titration, 1.16, 0.94, 1.17, 0.94, 0.89, 1.20, 0.93, 1.23, 1.46, 1.51, 1.75, 1.34; average of 12 samples, 1.21 per cent.

By acetic ether, alkaloid by titration, 2.6, 2.5, 2.7, 1.9, 1.63, 1.85, 1.7, 1.13, 2.18, 1.85, 1.76, 1.80; average of 12 samples, 1.97 per cent.

Lastly, it has been stated by Flückiger and others that the woody portion of ipecacuanha root is practically inert. In order to prove the accuracy or otherwise of this statement, we estimated the amount of emetine in the woody column from which the cortical portion had been separated; the *whole* root assayed 2.40 per cent by Lyons' method; the wood alone, which amounted to about 15 per cent of the total weight of the root, 0.8 per cent; that is, about 5 per cent of the total emetine present in this example existed in the woody column.—After *Pharm. Journ.*, March 9th.

Method of Estimating Tartaric Acid.

H. HEIDENHAIN, of Brooklyn, has made a study of the so-called Goldenberg's method of estimating tartaric acid. This method is one of the most commonly used, and has been held to give very satisfactory results. It is, however, affected by certain defects, which Heidenhain endeavored to eliminate.

Without entering into the details of the preliminary investigations, the following facts represent the main results, and these facts are practically utilized in the improved method which will be given below:

1. Acetate of potassium exercises a decomposing influence upon bitartrate of potassium.

2. This influence can be counteracted by the addition of much free acetic acid, a good proportion being 2 parts of free acetic acid for every 1 part in combination with potassium.

3. In presence of acetate of potassium and excess of acetic acid, the addition of alcohol causes a very complete separation of the bitartrate. The proper proportion of alcohol is 10 parts of alcohol of 95% for 1 part of the aqueous solution.

Improved Method.

[In the text here given, 1.88 Gm. of bitartrate are directed to be taken. It makes, of course, no difference whether the salt is pure or not, because whatever tartaric acid is contained in it will finally come out as a bitartrate. According to the author, the loss is only 0.2 to 0.1 per cent of the full amount of bitartrate that can possibly be obtained.]

Make a solution of 1.88 Gm. of the bitartrate, and 1.25 Gm. of carbonate of potassium, in a tared porcelain capsule. Bring it to a volume of 50 C.c., add 1.5 C.c. of glacial acetic acid, mix carefully, and evaporate until the contents amount to 10 Gm. Redissolve any dry crust on the sides of the capsule in the liquid contents, add 3 C.c. of glacial acetic acid, stir well, and allow to cool. Now add 100 C.c. of alcohol of 90%, stir thoroughly for a few minutes, allow to stand half an hour, filter, and wash once by decantation with alcohol, taking care that as little of the precipitate as possible be transferred to the filter. Cover the funnel, after the liquid has drained off, and close its outlet [to prevent the paper from becoming entirely dry while re-working the precipitate in the capsule].

Now dissolve the precipitate with hot water, add 1.5 C.c. of glacial acetic acid, again evaporate, preventing the formation of a permanent crust, to 10 Gm., and remove from the water-bath. Add 1.5 C.c. more of glacial acetic acid, mix thoroughly, and allow to cool. Then add 100 C.c. of alcohol of 95%, also 0.5 C.c. of a solution containing 200 C.c. of acetate of potassium, and 250 C.c. of glacial acetic acid in one liter, stir well during five minutes, allow to stand half an hour, filter through the same filter as before, wash with alcohol until the filtrate runs off entirely neutral, and then titrate with $\frac{1}{10}$ normal volumetric solution of potassa.

The author appends some practical hints, from which we select the following:

Since bitartrate of potassium is notably soluble in weaker alcohol, it is necessary to prevent the evaporation of the alcohol from the filter as much as possible. It is therefore advisable, after decanting the liquid, to at once cover the precipitate with alcohol, and to keep funnel and capsule as well covered as possible. Nevertheless, when paper filters are used, it is scarcely possible to prevent the filtrate from gradually becoming clouded through traces of bitartrate. When a Gooch's filter is used (platinum crucible with minute holes in the bottom, and asbestos filter), no cloudiness is noticed.

The washing (with alcohol) must be continued until the filtrate is perfectly neutral. When paper filters are used, the reaction of the filtrate must be tested while the funnel is perfectly full. Otherwise, errors may creep in, for it is possible that a neutral filtrate may be obtained while the filter and funnel is only half full of liquid, while the unsubmerged part of the filter may still retain traces of acid.—After *Zeitsch. f. anal. Chem.*, 1888, 704.

Testing Ether and Chloroform.

PROF. L. L. DE KONINCK, of Liège, states that even "pure commercial *ether*" always contains certain impurities, particularly organic sulphur compounds, which remain behind as bad smelling residue when the ether is allowed to evaporate spontaneously. Such an ether is truly called "sulphuric ether," as it contains free sulphur in solution.

The presence of the latter is quickly and surely detected by shaking a portion of the ether, in a test-tube, with a drop of pure, brilliantly lustrous mercury. If but very little sulphur is present, the surface of the mercury assumes merely a dull gray tint. If more is present, the whole liquid assumes a grayish or blackish tint from the diffusion of sulphide of mercury.

Prof. Koninck thinks that this test should be added to those now prescribed by the pharmacopœias.

Pure *chloroform*, in the cold, does not reduce an alkaline solution of permanganate of potassium, but it does so in presence of alcohol. Since both potassa and soda generally contain organic impurities, these alkalies cannot well be used for the test. It is therefore preferable to dissolve the permanganate in saturated solution of baryta. In this case, not a trace of reduction will be noticed. On adding this solution to chloroform containing even a trace of alcohol, it will at once turn green from the formation of potassium manganate.—After *Zeitsch. f. ang. Chem.*

[While the last-named test for alcohol in chloroform is useless for the pharmacopœial chloroform, which is purposely directed to contain a small percentage thereof, the test will probably be very serviceable for the detection of alcohol in *essential oils*.—ED. AM. DR.]

Estimation of Iron in Water.

J. CARTER BELL communicates the following paper to the *Journ. of the Soc. of Chem. Industry* (March 30th):

In a water case in which I was engaged some months since, this question was asked in court: How much iron may a river water contain and yet be fit for bleaching purposes? An eminent water analyst was in the witness-box; he made reply, from 0.1 to 0.2 of a grain to the gallon. This gentleman could have had no experience in bleaching, or he could not have given such an absurd statement. I think I may safely assert that no river water in the kingdom contains so large a quantity of iron as 0.1 of a grain to the gallon, of course chalybeate springs excepted, and even if these were to run into a river the iron would soon be deposited. The case in which I was engaged was where a firm of bleachers brought an action against a firm of dyers who were six miles up the river. The complaint was that waste dye waters containing iron were thrown into the river, and this polluted water found its way into the complainant's reservoir. At that time I obtained many samples of water from various points of the six-mile course, and I analyzed several hundred samples of water for iron, and in no one case when the sample was taken about a mile from the offending works could I find an amount of iron equal to 0.1 of a grain to the gallon, and I need not say that the quantity found at the point named would be infinitesimally small by the time it arrived at the complainant's works. The judge seemed greatly impressed with one of the complainant's experts, who gravely informed his lordship that when the iron was once put into the water, the iron, being indestructible, must of necessity come down to the complainant's works and do the damage which was alleged. It would have been fairer on the part of this witness if he had said that the iron in the water at complainant's works was no more than is found in the Thames, Severn, or any other great river in England, which may vary from one part in five millions to one part in seven or ten millions.

The process I adopted for the estimation of the iron was

a very considerable modification of Dr. Carnelley's method, of which he read an account before the Manchester Literary and Philosophical Society in 1874. This colorimetric method is not new, for a paper was published in 1871 by H. Rheineck in *Dingler's Polytechnisches Journal*, on the estimation of iron in liquids used in dye works.

Seventy C.c. of the water were evaporated to dryness in a platinum dish, the residue gently ignited to burn off organic matter. One C.c. of pure nitric acid was then added, and allowed to flow over all the residue. The nitric acid was evaporated off on the water-bath. The residue was again moistened, this time with 1 C.c. of a 10-per-cent solution of hydrochloric acid, about 5 or 10 C.c. of distilled water added, warmed on a water-bath, and the solution filtered into a 50 C.c. Nessler tube. The filtrate was made up to 50 C.c. This 50 C.c. must be poured into another 50 C.c. tube containing 1 C.c. of freshly made ferrocyanide solution. To this mixture 1 C.c. dilute nitric acid was added; this is then compared with a tube containing a known weight of iron.

Standard solution of iron: 1 C.c.=0.001 of iron.

This is made by taking the purest and finest iron wire, dissolving in nitrohydrochloric acid, evaporating to dryness, taking up with a slightly acid solution of hydrochloric acid. I consider this preferable, as it is more stable than the sulphate of iron and ammonium.

Standard ferrocyanide: 1 part of salt in 25 parts of water.

Standard nitric acid: 50 C.c. of strong acid made up to one liter.

Standard hydrochloric: 100 C.c. of strong acid made up to one liter.

It is absolutely necessary that a blank experiment be made with pure distilled water; if a slight blue color is obtained, a correction can then be made in estimating the iron in the sample of water.

New Method of Examining Alcohol for Aldehyde.

THE previous methods of testing commercial alcohols for small quantities of aldehyde and amyl alcohol are only qualitative, and they also fail in distinguishing between these two impurities. C. Girard and X. Rocques have succeeded in overcoming these defects by the following method: 3 Gm. of the hydrochloride of metaphenylenediamine are dissolved in 200 C.c. of alcohol of 50%, and the solution boiled for half an hour with an inverted condenser; the liquid acquires a yellow color. After cooling for half an hour the solution is shaken; if aldehyde be present, the color gradually deepens and acquires a fine green fluorescence, due to the action of the air. The liquid is then rapidly distilled until 125 C.c. have passed over, when the distillate will be of 75% strength. The distillate is examined for amyl alcohol by Savalle's method, which consists in heating to 66° C. with an equal volume of sulphuric acid, producing a brown coloration, the depth of which can be compared with that given by known percentages of pure amyl alcohol in alcohol of 75%. The aldehyde compound remains almost entirely in the residue of the distillation, whilst the amyl alcohol passes over completely with the 125 C.c. The quantity of aldehyde is estimated by the depth of coloration of the residual liquid. —*Compt. Rend.* and *J. Soc. Chem. Ind.*

Note by Ed. Am. Drugg.—Metaphenylenediamine is an artificially obtained organic base, derived from the phenol nucleus (C_6H_6), by substitution of 2 molecules of amidogen (NH_2) for 2 atoms of hydrogen. Its formula, therefore, is $C_6H_4(NH_2)_2$. It is a solid, has strong basic properties, and forms salts with acids.

Boric Acid a Natural Constituent of Wine.

GEORGE BAUMERT makes the surprising announcement (*Ber. d. D. Chem. Ges.*, 1888, 3290) that, according to his investigations of German as well as Californian wines, must, and portions of the vines themselves, boric acid is a natural constituent of wine. This had previously been announced already by Soltsien and Ripper. According to Baumert, there is no difficulty in detecting the boric acid with turmeric paper in the ash.

Note by Ed. Am. Dr.—If this statement is correct, the analyses of the soils of many vineyards, in which chemists did not find any boric acid, will have to be repeated. It is hardly probable that boric acid is a necessary or unavoidable constituent of wine, though it may be a frequent and accidental one.

A New Reaction for Uric Acid.

To a very small quantity of uric acid, in a porcelain evaporating dish, are added two drops of water and one or two drops of nitric acid or bromine water. This is slowly evaporated so that the residue has a yellow and not a brick-red color. The residue is then dissolved in two or three cubic centimeters of concentrated sulphuric acid, and mixed with a few drops of commercial benzene, which gives a blue color, but changes to a brown as soon as the benzene evaporates. On further addition of benzene the blue color reappears. This coloration is due to the action of thiophene on alloxan and its derivatives obtained by the oxidation of uric acid. Chemically pure benzene gives no coloration.—DENIGÈS in *Chem. Zeit.* and *J. Anal. Chem.*

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EDITORIAL.

THE present Acting Secretary of the Treasury has recently rendered a decision regarding the release of alcohol from duty which will, no doubt, be hailed with satisfaction by all charitable institutions, provided they can manage to avail themselves of it. We know that applications have in former years been made to the Secretary of the Treasury for the purpose of having the duty on alcohol used in public hospitals remitted, but the decision has always been adversely, because the law did not appear to be broad enough to cover this. The section of the Revised Statutes of the U. S. relating to this subject reads as follows: "The Secretary of the Treasury may grant permits to any incorporated or chartered *scientific institution* or *college of learning* to withdraw alcohol in specified quantities from bond without payment of the internal revenue tax on the same, or on the spirits from which the alcohol has been distilled, for the *sole purpose* of preserving specimens of anatomy, physiology, or natural history belonging to such institution, or for use in its chemical laboratory. Also to any *scientific university or college of learning* created and constituted such by any State or Territory under its laws, though not incorporated or chartered." This section has now been interpreted by the Acting Secretary of the Treasury to cover also the following uses of alcohol in *hospitals:* 1. In the manufacture, in the laboratory, of tinctures, liniments, and other pharmaceutical preparations for use in the *hospital wards* and in the *out-patient department.* 2. As a lotion for bathing the afflicted parts of the patients under treatment in the hospital and out-patient department. 3. As an antiseptic wash by the surgeons before and after operations in both departments. 4. As an antiseptic solution for cleansing surgical instruments. 5. As an antiseptic solution for preparing and preserving catgut ligatures to be used in surgical operations. 6. For burning in spirit lamps, principally in the analysis of urine. It is distinctly provided, however, that the alcohol and the preparations mentioned shall be used only in the manner prescribed, and shall never be sold to any person inside or outside the hospital.

There are, however, various other purposes, equally legitimate, for which alcohol is required, and which should not be excepted, such, for instance, as the preparation of certain medicated gauzes (Bruns' carbolized gauze, etc., etc.). And besides, the stipulation that no preparation containing or made with free alcohol shall be sold will probably render it impossible to obtain free alcohol, for any institution which charges board for in-door patients or demands a fee from out-door patients.

Correction.—In reporting the list of Officers of the College of Pharmacy of the City of New York elected at the recent annual meeting, one of the names has accidentally been omitted. Among the trustees elected, to serve for three years, should have been the name of Mr. Henry Schmid.

The Paris International Exposition.

THE following countries or sections will be officially represented: In Europe: Greece, Norway, Servia, Switzerland, San Marino, and Monaco; in Asia: Japan, Persia, and Siam; in Africa: Morocco, and the South African Republics; in Oceanica: Victoria, New Zealand, and New South Wales; and in America, the United States, the Argentine Republic, Bolivia, Chili, Colombia, Ecuador, Guatemala, Hayti, Mexico, Nicaragua, Paraguay, San Domingo, San Salvador, Uruguay, and Venezuela. Besides, private committees represent all the other States of Europe except Germany, and also Egypt and Brazil. Some British colonies also, not enumerated separately, will be represented. Great Britain has obtained the enormous space of 25,000 square meters, all told, by far the largest aggregate. Its exhibitors are at work in dead earnest, and a fine display is expected. The United States has 8,000 meters, and will be extremely well represented in the machinery gallery.—*Am. Tech. J.*

An Act Relating to the Practice of Pharmacy.

THE following Senate Bill No. 319 was introduced into the Senate of this State February 8th, 1889, by Mr. Laughlin, referred to the Committee on Public Health, reported favorably, was voted affirmatively, and sent to the governor for approval:

Section 1. To entitle any person to a license as a pharmacist or assistant pharmacist from any board of pharmacy created under the laws of this State, he must prove to the board of pharmacy to which application is made, in addition to the present requirements of the law relating to the granting of licenses by such boards: That he is a resident of the city, county, or district for which the board of pharmacy to which application is made is created, or, if a non-resident, that he intends to practise in said city, county, or district; that he has not applied for a license to, or been examined by, any other board of pharmacy of this State and been refused such license within six months immediately preceding, which proof may be made by his own affidavit.

§ 2. All acts and parts of acts inconsistent with this act are hereby repealed.

Louisiana State Pharmaceutical Association.—The annual meeting of this Association was held at New Orleans on April 10th to 12th, President C. L. Keppler in the chair. The meeting was well attended, and many important matters were discussed and disposed of. Among them was a proposition that the pharmaceutical laboratory of Tulane University, which is under the direction of Mr. A. L. Metz, an alumnus of the College of Pharm. of the City of New York, and the usefulness of which to the profession has been fully recognized, be assisted by a financial contribution necessary to insure its continuance. The proposition was finally adopted, and the sum of $250 was appropriated for this purpose. A committee of the Association having been delegated to visit the Louisiana State Medical Society, then in session, for the purpose of bringing to its notice the National Formulary, reported that they had been very courteously received, and, after discussion of the matter, the Society had unanimously resolved to accept the National Formulary as the standard for all unofficinal preparations. The officers elected for the ensuing year are: President, F. M. Brooks, Baton Rouge; Vice-Presidents, J. B. Lavigne and F. C. Godbold; Recording Secretary, L. F. Chalin; Corresp. Secretary, Mrs. E. Rudolf; Treasurer, E. Brand, all of New Orleans; Executive Committee, L. L. Abbott, Chairman, E. W. Bourg, A. K. Finlay, John Johnson.

The next meeting will be held at New Orleans on the first Wednesday of April, 1890.

College of Pharmacy of the City of New York.—The fifty-ninth annual commencement of the college was held on Tuesday, April 16th, at Steinway Hall, when the following students were awarded their certificates of graduation, or diplomas:

Amend, C. A. L., New York, N. Y.; Arndt, T. H., Jersey City, N. J.; Austin, R. H., Hunter, N. Y.; Bancker, W. D., Jr., Brooklyn, N. Y.; Barsky, Jos., New York, N. Y.; Beardmore, W. H., Leicester, England; Benjamin, F. E., Riverhead, L. I.; Becker, E. F. W., New York, N. Y.; Beekman, H. G., New York, N. Y.; Bird, W. H., Brooklyn, N. Y.; Bischof, E. H., New York, N. Y.; Blatz, Chas. L., Norwalk, O.; Boenau, Th. C., Brooklyn, N. Y.; Boysen, H. C., New York, N. Y.; Brandus, G., New York, N. Y.; Brown, H. E., Brooklyn, N. Y.; Brown, M. C., Gallipolis, O.; Brownell, F. E., Auburn, N. Y.; Bru, J. J., Jersey City Heights, N. J.; Cahoon, Jos. H., Brooklyn, N. Y.; Comstock, Jas. T., Smyrna, N. Y.; Cook, Alb. R., Maracaybo, Venezuela; Daly, P. J., Morristown, N. J.; Davis, W. O., New York, N. Y.; Dimmick, H. H., Plymouth, N. Y.; Eckert, F. H., Jersey City, N. J.; Eisentrager, H. F., New York, N. Y.; Elston, J. M., Newark, N. J.; Evenden, A. W., Newark, N. J.; Fels, P., New York, N. Y.; Fendler, Amelia M., New York, N. Y.; Fincke, H. S., L. I.; Fischer, E. E., Newark, N. J.; Flood, I., Brooklyn, N. Y.; Foerster, E., New York, N. Y.; Gardner, A., New York, N. Y.; Gelbert, D. G., Scranton, Pa.; Graeser, H. H. R., New York, N. Y.; Hall, G. E., New York, N. Y.; Hay, E. H., Portland, Me.; Hollinger, Aug., New York, N. Y.; Hough, A. E., Newton, N. J.; Hubbard, A. E., Middletown, Conn.; Imhof, G. J. M., Brooklyn, N. Y.; Jackson, A. H., Norwalk, Conn.; James, F. K., New York, N. Y.; Joannes, L. J., New York, N. Y.; Jones, O. F., Brooklyn, N. Y.; Kahrs, W., New York, N. Y.; Kaiser, G. H., New Haven, Conn.; Kalish, O. G., New Britain, Conn.; Keale, Ch. F., Brooklyn, N. Y.; Knoepfel, W. H., Scranton, Pa.; Kugler, W. G., Hoboken, N. J.; Kurtz, H. G., Akron, O.; Leverty, J. A., Fairfield, Conn.; Lutz, Ch., New York, N. Y.; Madison, W. H., Brooklyn, N. Y.; Magenheimer, Chr. H., New York, N. Y.; Mahegin, Katherine C., Brooklyn, N. Y.; Martin, J. F. H., Brooklyn, N. Y.; Mathews, H., New York, N. Y.; McDonald, Th. H. A., Cairo, Ill.; McDermott, J., New York, N. Y.; Milligan, R. E., St. John, N. B.; Mills, H. M., Lowville, N. Y.; Millspaugh, W., Newburgh, N. Y.; Monaghan, Seraphine, New York, N. Y.; Morey, J. H., Saratoga Springs, N. Y.; Murken, A. P., Brooklyn, N. Y.; Ottel, F. A., New York, N. Y.; Oltmann, H. A., Newark, N. J.; Overmiller, N. A., New York, N. Y.; Quencer, W. J., Watertown, N. Y.; Rheineck, W. M., New York, N. Y.; Roese, Jr., W., New York, N. Y.; Schaefer, G. J., Newark, N. J.; Schine, Ch. A., New York, N. Y.; Schmidt, A., New York, N. Y.; Schroeder, F. O., Newark, N. J.; Schwarz, S., Newark, N. J.; Seither, Jr., L. C., New York, N. Y.; Sevin, F. D., Norwich, Conn.; Siemann, F. H., New York, N. Y.; Sniffin, W. S., Port Chester, N. Y.; Sowa, Ch., New York, N. Y.; Spaeth, G. F., New York, N. Y.; Spaeth, O. C., New York, N. Y.; Stein, O. M., Brooklyn, N. Y.; Steinhardt, A. P., Brooklyn, N. Y.; Stemmermann, W. H., Newark, N. J.; Strassberger, G., Montgomery, Ala.; Terry, A. F., Cienfuegos, Cuba; Thum, G. C. E., New York, N. Y.; Trautmann, C. E., Jersey City, N. J.; Voorhees, A. V. B., Bath Beach, L. I.; Walter, H., New York, N. Y.; Weigand, J. A., New York, N. Y.; Wheeler, W. H., Litchfield, Conn.; White, W. S., Dover, N. J.; Williams, Ch. H., Thomaston, Conn.; Williams, G. N., Brooklyn, N. Y.; Woldert, E. A., Tyler, Texas; Wolf, A. S., Middletown, N. Y.; Yarnig, G. E., Adams, Mass.

Alumni Association of the College of Pharmacy of the City of New York.—This year the Alumni Association inaugurated a new departure, making the day of the annual meeting an occasion for a general reunion and a reception of the graduating class, as well as the friends of the students and members. During the exercises the roll of honor of the Junior Class was announced, and prizes were awarded to the three standing highest on the list. The roll is as follows: O. G. Harrison, John P. Arnold, E. B. Wells.—W. J. Robinson, A. L. Goldwater, A. Stierle, Jr., N. P. Snow, A. Dubus, Miss J. A. Britton, A. Lochwing, J. E. Renton, E. T. Smith, W. Schroeder.

CORRESPONDENCE.

Section on Scientific Papers.

EDITOR AMERICAN DRUGGIST.

DEAR SIR:—In calling attention to the fact that the approaching annual meeting of the Am. Pharmaceutical Assoc., to be held in San Francisco, will take place two months earlier than has been the custom to hold this meeting, I also desire to state that all papers should be in the hands of the chairman of this Section at the earliest date possible—by June 1st at the latest. Owing to the distance, it will take a longer time than usual to get the papers in print; and, by the experience of the past two years, it has been proven very desirable to have printed copies of each paper for use at the meeting.

Although it is the intention to have all contributions to this Section put in type, there will, of course, be no publication of any paper, nor copies given out, until the paper is presented to the meeting to be read, when the copies will be circulated amongst the members present.

EMLEN PAINTER,
Chairman Section on Scientific Papers,
Broadway and 34th street, N. Y.

The A. P. A. Excursion to San Francisco, and Cost of the Trip.

EDITOR OF THE AMERICAN DRUGGIST.

DEAR SIR:—In the issue of April 1st of one of the pharmaceutical journals, there appeared a long article concerning the A. P. A. Excursion to California which is in many respects erroneous, and in no way authorized by the association or the committee on arrangements, notwithstanding the statements made purport to be founded upon the official acts of the committee.

In order that those who contemplate making this trip may not be deceived and misled by the article referred to, and without taking it up in detail, I beg that you will publish in your next issue the following statement of facts, for the better information of those who may desire to join the excursion to the Pacific Coast.

In making arrangements for a large party, it is very difficult to fix upon one plan that will suit every one; hence two general plans or excursions were approved by the committee, with the expectation of a large enough

party in each to be able to secure special trains and special privileges and accommodations for both.

The plan of one of these excursions originated with the agent of the U. P. Railway in St. Louis, and has been designated by President Alexander as the "Western and Southern Official Train," of which Dr. Sander was appointed to manage the details. This excursion, as recently announced, is limited to 150 travellers, and starts from St. Louis. Parties east of this point who wish to join this excursion will find it a saving to purchase *round-trip tickets from the starting point*, and they should correspond with Mr. J. F. Aglar, of the U. P. Railway, or Dr. Enno Sander, 129 S. 11th street, St. Louis, to learn just how and when to join the party.

The expense of this trip, as announced in the circular issued by the U. P. in St. Louis, is $150 for round trip from that point, with all expenses paid *outward*, such as sleeping-cars, meals, etc., and railroad fare paid back to St. Louis, but not sleeping-cars or other expenses on the return trip. Sleepers one way will cost $14.50, and meals 75 cents each. Parties east of St. Louis going by this excursion must add to the above cost the round-trip fare between starting point and St. Louis, besides sleeping-cars and meals. For instance, from New York must be added, fare, $43; sleeping-cars, $12; and meals 75 cents each. This would make the total cost from New York, for fare and sleeping-cars, $219.50, including meals between St. Louis and San Francisco on the trip outward. To which sum for the minimum expense must be added living expenses during the stay in San Francisco and meals the balance of the trip.

The other excursion approved by the committee on arrangements is the one announced by a circular issued from the office of the chairman of the committee March 1st, and several times reprinted later, adapting it to the different localities. This party is not limited in number, and ample provisions are made for all pharmacists and their friends who will join them—the more the better; nor is it limited to any locality, but may be considered an official excursion of the whole association from all points east of the Rocky Mountains.

The total cost of this trip to the average traveller will not differ greatly from the other, except that the minimum cost is less, and the maximum in either case is just what the individual may choose to make it. For the round-trip ticket and Pullman cars the cost from different central localities will be as follows (as a matter of information, the date of starting is also given):

		Fare.	Sleeping-Cars.	Total.
June 13th,	8:30 A.M., Boston	$143 25	$42 00	$185 25
" 13th,	9:40 A.M., New York	135 00	41 00	176 00
" 13th,	11:50 A.M., Philadelphia	133 00	41 00	174 00
" 13th,	8 A.M., Baltimore	127 00	41 00	168 00
" 13th,	8:55 A.M., Washington	125 00	41 00	166 00
" 13th,	11:45 P.M., Buffalo	122 40	37 00	159 40
" 13th,	11:20 P.M., Pittsburgh	121 10	36 00	157 10
" 14th,	3:10 P.M., New Orleans	92 00	30 00	122 00
" 14th,	Memphis	92 00	29 00	121 00
" 14th,	8:20 P.M., St. Louis	92 00	29 00	121 00
" 14th,	7:30 P.M., Chicago	100 00	31 00	131 00
" 15th,	10 A.M., Kansas City	80 00	26 00	106 00
" 15th,	7:30 A.M., Omaha	80 00	26 00	106 00
" 18th,	7:30 A.M., Denver	70 00	22 00	92 00

These Pullman car charges are for double berths, which may be used by one or two persons at the option of the travellers; if occupied by two, the sleeping-car charges for each will, of course, be just one-half of the price above given.

To this total must be added cost of meals and hotels *en route* and during the stay in San Francisco, which will range from $1.50 to $5 a day, according to the individual, as his inclination may be extravagant or otherwise.

The northern route has been selected as the most interesting for the return trip, which will cost $15 additional fare. This sum must be paid at the point the overland ticket is obtained (Chicago or the Missouri River as the case may be), at which point the return route must be decided upon, whether the Northern Pacific is selected or not. Passengers may return by any of the transcontinental lines terminating in San Francisco, without additional cost.

All tickets by whatever route are good for six months from date of purchase, with stop-over privilege wherever desired. Tickets can be purchased at any Central Railroad office, and the travellers can join the excursion at the most convenient point. The chairman of the committee should be promptly notified by those who contemplate going, so as to enable him to make the necessary arrangements, and a deposit to cover the sleeping-car charges should be made not later than June 1st.

Arrangements have been made with the railroad companies for both excursion parties to have elegantly appointed special trains,-run on special time, so as to better secure the pleasure and comfort of the travellers.

Circulars and illustrated pamphlets descriptive of the route and any further information desired on the subject will be cheerfully furnished by the undersigned.

EMLEN PAINTER,
Chairman Com. on Arrangements, A. P. A.,
Broadway and 34th street, New York.

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,309.—**Dry Plates** (H. B.).

It is altogether outside of the scope of this journal to go into the details of the process of making dry photographic plates. But we will refer you to some good authorities, viz.: *Scientific American Supplement*, numbers 205, 299, 190, 384, and a work just published: "The Processes of Pure Photography," by W. K. Burton and Andrew Pringle, sold by The Scovill & Adams Co. of New York ($2.00).

No. 2,310.—**Oleite or Polysolve** (supplement to query 2,276).

In referring to our answer to query No. 2,276, in which we were asked what "oleite" was, Messrs. Lehn & Fink announce that all rights to the process for manufacturing *polysolve* have been secured by patents, held by the inventor and controlled by Messrs. Lehn & Fink. The last-named fact was not known to us. As to whether the names "oleite" or "solvin" are legitimate synonyms, we must refer our reader to the patentee himself.

No. 2,311.—**Prescription Query** (F. H.).

This correspondent asks why a precipitate is formed in the following mixture on standing:

℞ Tr. Aurantii	fl. 3 6
Vin. Colch. Rad.	fl. 3 4
Potass. Iodid.	3 2
Potass. Carbon.	3 2

M. Fiat sol.

The precipitate is partly carbonate of potassium, which is not altogether soluble in the menstruum, as the latter contains altogether about 40 per cent of alcohol. Besides, the alkaline carbonate precipitates a small quantity of the constituents of both of the tinctures. By omitting the carbonate of potassium, the prescriber would enable the apothecary to dispense a better-looking mixture.

No. 2,312.—**The Manufacture of Fruit Essences** (Omaha).

We do not think that it would pay to undertake the manufacture of fruit essences, unless the works could be run in connection with others from which the several materials necessary in the preparation of the essences could be obtained at self-manufacturing prices. Moreover, the depot for their sale must be at certain prominent trade centres.

The most important, and at the same time troublesome, constituents of these essences are certain compound ethers, principally derived from the amyl series. And it is here where the facilities of a few manufacturers enable them to prevent all competition.

If our correspondent has a steady demand for artificial fruit essences, we believe he might make a special contract with one of the large manufacturers of the fruit ethers at very advantageous terms.

No. 2,313.—**Amount of Carbonic Acid from Sugar by Fermentation** (Brooklyn).

It has been determined by careful experiments (for instance, by Joedlbauer) that cane-sugar and anhydrous maltose yield, upon perfect fermentation, 49 per cent (more exactly 49.04 per cent) of carbonic acid gas, while dextrose yields 46.54 per cent. The following table gives a comparative view of the principal results from 100 Gm. of each of the following sugars:

	Cane-sugar.	Dextrose.	Maltose, cryst.	Maltose, anhyd.
Alcohol	51.11	48.67	48.37	51.08
Carbonic Acid Gas	49.03	46.54	46.59	49.04
Succinic Acid + Glycerin	3.96	3.71	3.74	3.95
Undetermined	1.01	0.94	0.90	0 95
Total	105.11	99.86	99.60	105.02

The most favorable temperature for alcoholic fermentation is 34° C. (93.2° F.), and the most favorable degree of fermentation of the liquid is one corresponding to 8 per cent of sugar.

No. 2,314.—**Wine Vinegar** (Richmond).

Public analysts are pretty well agreed regarding the criteria by which genuine cider vinegar is recognized. Regarding wine vinegar, the agreement is less perfect, no doubt because a much smaller amount of this is sold in our market. A recent paper by Hugo Eckenroth (in *Pharm. Zeit.*) contains some useful data which may be of use to our correspondent:

The specific gravity of white wine vinegars varies between 1.0116 and 1.0147. If it is below 1.010 the presence of alcohol is rendered probable, though this is rare. On evaporating a weighed quantity of wine, and drying the residue at 105° C. for several hours, until it ceases to have an odor of acetic acid, it should leave between 0.35 and 1.51 per cent of residue. Wine vinegar seldom contains more than traces of glycerin, the amount being usually between 0.05 and 0.1 per cent. The quantity of acetic

acid varies between 4 and 7 per cent: a good wine vinegar should contain at least 6 per cent. Of course, for actual use, such vinegar may be suitably diluted. Tartaric acid is present in all wine vinegars. To determine it, not less than one pint, better one quart, of the vinegar should be used. The total ash of wine vinegar rarely exceeds 0.25%; usually it is not more than 0.15%; and the ash always contains phosphoric acid.

No. 2,315.—**Paraldehyde** (Portland).

The following characterization, given by the recently published Pharmacopœia Hungarica, may serve you as a guide, until our own pharmacopœia shall give a description and tests based upon independent investigation:

Paraldehyde is a colorless liquid of a peculiar aromatic and suffocating odor. It has the spec. gr. 0.998, and boils at 124° C. When cooled to a temperature of +10° C., it congeals to a deliquescent, colorless, crystalline mass. It is soluble in 10 parts of water, and miscible with alcohol and ether. The cold-prepared aqueous solution becomes cloudy on boiling. On adding an aqueous solution of paraldehyde to ammoniacal solution of nitrate of silver, mixed with 1 drop of solution of soda (cont. about 33 per cent of caustic soda), and warming, metallic silver will be separated. Paraldehyde should have a neutral reaction, should congeal at the temperature of melting ice [according to above, already at +10° C.], and be completely volatilized at a temperature of 124° C. On warming 5 to 10 Gm. for some time on a water-bath, the liquid should completely evaporate without leaving a fixed residue having a foreign odor. The aqueous solution should not be rendered turbid by silver nitrate. Maximum single dose: 3 Gm. (45 grains); maximum daily dose: 6 Gm. (90 grains). Paraldehyde should be kept in a carefully stoppered bottle, protected from the light.

No. 2,316.—**Rubber-Stamp Ink** (Harrisburg).

The usual rubber-stamp inks are prepared with water-soluble aniline colors and glycerin. A good formula, which we have tested practically, is given by Dieterich:

Blue Rubber-Stamp Ink.

Aniline Blue, water-sol., 1 B.	3 parts.
Distilled Water	10 "
Pyroligneous Acid	10 "
Alcohol	10 "
Glycerin	70 "

Mix them intimately by trituration in a mortar. [The blue should be well rubbed down with the water and the glycerin gradually added. When solution is effected, the other ingredients are added.]

Other colors are produced by substituting for the blue any one of the following:

Methyl Violet 3 B	3 parts.
Diamond Fuchsin I	2 "
Methyl Green, yellowish	4 "
Vesuvin B. [brown]	5 "
Nigrosin W. [blue-black]	4 "

If a bright-red ink is required, 3 parts of eosin BBN are used, but the pyroligneous acid must be omitted, as this would destroy the eosin. Other aniline colors, when used for stamping ink, require to be acidulated.

No. 2,317.—**Biniodide of Potassium** (New York).

A prescription was recently presented to a pharmacist of our acquaintance which read as follows:

℞ Potass. Biniodidi	gr. xx.
Hydrarg. Biniodidi	gr. ij.
Elix. Taraxaci Co.	fl. oz. ij.

He had no chance of communicating with the prescriber and declined to put it up, as there is no such preparation as "biniodide of potassium," and he did not wish to make any change in the prescription himself. Of course, it is evident that the prescriber meant to write "Potass. Iodidi," and that he was already thinking of the next line, thus writing the word "biniodidi" twice. Our friend informs us that the prescription was taken to another store and there unhesitatingly dispensed, the parties in charge asserting that they had every ingredient and were able to put it up. Now, even if there ever had been a biniodide of potassium in the market, this could only be a mixture of 1 molecule of iodide of potassium and 1 atom of *free* iodine—a compound which would produce alarming or fatal results, if used in doses like the simple iodide. Hence the statement on the part of the dispensers, that they were able to put up the prescription, was evidently a prevarication, and they probably dispensed simply iodide of potassium. But we cannot approve the conduct of the dispensers, as it was clearly their duty to notify the prescriber of his blunder, to prevent him from repeating it, or else to decline to dispense the prescription.

No. 2,318.—**Selters Water** (A. J.).

Selters water is obtained from four springs joined together to a well at Niederselters, situated near Wiesbaden, on the Emsbach. It is a mineral water characterized by the presence of considerable chlorides, a moderate quantity of carbonates, and a small amount of sulphates. The natural water contains a great number of constituents, some of them only in very minute quantities. The temperature of the natural water is about 61–62° F. In making imitations of natural mineral waters, it is impossible to bring into solution, or at least to maintain in solution, every one of the natural constituents, even if it were possible to dissolve them. It has, therefore, long been customary to omit, in artificial mineral waters, any secondary ingredients, or such as were deemed immaterial, and which would eventually produce cloudiness or a precipitate, for it would not be possible to sell such waters. What is generally sold here as selters, in siphons, is an artificial product, usually made by dissolving merely chloride, carbonate, and sulphate of sodium in water, and charging the solution with gas. For the ordinary table purposes, such a water serves probably well enough. But it can hardly be expected that much remedial effect will be obtained from it.

Basing upon Fresenius' analysis, Dr. Heinrich Raspe proposes to employ the following ingredients for making the artificial water:

	Parts.		Parts.
Potass. Chloride,	0 572	Magnes. Sulphate,	0.283
Ammon. "	0.052	Iron (ferrous) Sulphate,	0.040
Sodium "	16.762	Manganous "	0.007
Lithium "	0.036	Sodium Bicarbonate,	20.289
Magnesium "	2.061	" Nitrate,	0.061
Calcium "	3.419	" Phosphate,	0.008
Strontium "	0.023	" Silicate,	0.425
Barium "	0.0017	In Water,	10,000
Aluminium "	0.0047		

charged with carbonic acid gas. The natural water contains 1184.6 C.c. of CO_2 in 1 liter.

In the neighborhood of Niederselters are found several other springs which yield practically the same water. These are likewise exported and sold as selters or selzer.

No. 2,319.—**Citro-chloride of Iron** (D. F.).

Citro-chloride of iron is a name applied to a compound produced by bringing together ferric chloride and the citrate of an alkali in certain proportions, which results in the more or less complete transposition of the bases and acids, bringing about a most remarkable change of physical and chemical properties. Thus, while ferric chloride has a most decided astringent and ferruginous taste, the new compound is practically free from these characteristics, and for this reason its solution, containing some alcohol, is very commonly called "Tasteless Tincture of Iron." Regarding the exact chemical constitution of the compound various theories have been offered, but no absolute certainty has been reached. Until this has been cleared up by further chemical research, there will be no harm in assuming—temporarily, of course—that the new compound consists mainly of ferric citrate and the chloride of the alkali, with such an excess of the citrate of the latter as did not enter the reaction.

Now as to the tincture of citro-chloride of iron, we would refer you to the National Formulary, where the formula is given under No. 397. As we wish to append a short note to this, we will first quote the formula:

Tinctura Ferri Citro-chloridi.

Tincture of Citro-chloride of Iron.

Tasteless Tincture of (Chloride of) Iron.

Solution of Chloride of Iron (U. S. P.)	4 fl. oz.
Citrate of Sodium	7 tr. oz.
Alcohol	2½ fl. oz.
Water	enough to make 16 fl. oz.

Mix the solution of chloride of iron with 4 fl. oz. of water, and dissolve in this mixture the citrate of sodium with the aid of a gentle heat. Then add the alcohol, and, when the solution has become cold, make up the volume with water to 16 fl. oz. Set the product aside in a cold place for a few days, if convenient, so that the excess of saline matter may separate. Then filter, and pass enough cold water through the filter to restore the original volume.

Each fluidrachm contains an amount of iron equivalent to about 7½ grs. of dry chloride of iron (ferric).

This preparation is practically identical in strength of iron, but not in the quantity of alcohol, with the officinal tinctura ferri chloridi.

When the preceding formula was discussed and tried by the Formulary Committee, citrate of potassium was directed to be used. Prolonged experience with the process, however, showed that a very copious precipitate was produced in the final tincture when this salt had been used. This is owing to the fact that chloride of potassium (of which most of the precipitate consists) is much less soluble in the menstruum of the "tincture" than chloride of sodium. For this reason citrate of sodium was substituted for citrate of potassium. But as the former salt is not always to be had, and there is no necessity of first preparing it in a dry state and then again dissolving it, an equivalent of the 7 troy ounces of the salt may be obtained as follows:

Bicarbonate of Sodium	2,280 grains.
Citric Acid	4,160 grains.
Water	q. s.

Dissolve the citric acid in 7 fl. oz. of water, gradually add the bicarbonate of sodium, and heat gently until perfect solution has taken place and no more gas is given off. Then add the solution of chloride of iron, and the alcohol. Allow to cool, and proceed further as directed above.

Information Wanted.

What is Radam's Microbe Killer?—A. H. K.